A DISSERTATION ON

"A CLINICAL STUDY ON WOMEN PRESENING WITH MASTALGIA TO A TERTIARY REFERRAL CENTRE IN SOUTHINDIA"

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BONAFIDE CERTIFICATE

Certified that this dissertation is the bonafide work of Dr.**V.C.KALYANASUNDARABHARATHI** on "**A CLINICAL STUDY ON WOMEN PRESENING WITH MASTALGIA TO A TERTIARY REFERRAL CENTRE IN SOUTHINDIA"** during his M.S. (General Surgery) course from July 2015 to September 2015 at the Madras Medical College and Rajiv Gandhi Government General Hospital, Chennai – 600003.

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DECLARATION

I, certainly declare that this dissertation titled, **"A CLINICAL STUDY ON WOMEN PRESENING WITH MASTALGIA TO A TERTIARY REFERRAL CENTRE IN SOUTHINDIA"**, represent a genuine work of mine. The contribution of any supervisors to the research are consistent with normal supervisory practice, and are acknowledged.

I, also affirm that this bonafide work or part of this work was not submitted by me or any others for any award, degree or diploma to any other university board, neither in India or abroad. This is submitted to The Tamil Nadu Dr.MGR Medical University, Chennai in partial fulfillment of the rules and regulation for the award of Master of Surgery Degree Branch 1 (General Surgery).

Dr.V.C.KALYANASUNDARABHARATHI

Date :
Place:

LIST OF ABBREVIATIONS

FA	:	Fibroadenoma of the Breast
FC	:	Fibrocystic Disease of the Breast
NAD	:	No Abnormality Detected
RE	:	Reassuranace
TOP+BS	:	Topical Breast Analgesic and Breast Support
PRIM	:	Evening Primrose Oil and Vitamins
DAN	:	Danazol
SX	:	Surgery
Cyc	:	Cyclical Mastalgia
Non-c	:	Non-Cyclical Mastalgia
Veg	:	Vegetarian
Non-veg	:	Non-Vegetarian
V.A.S	:	Visual Analogue Scores

ABSTRACT

BACKGROUND AND OBJECTIVE

Breast pain or mastalgia is one the most common clinical problems with which women approach surgical outpatient department. It is imperative to have a clear picture regarding the epidemiological, pathological and radiological factors pertaining to this problem.

METHODS

Between July 2015 and September 2015, 100 patients with mastalgia who got consultation as outpatient or inpatient in Institute of General Surgery, Rajiv Gandhi Government General Hospital, Chennai were subjected to evaluation and management as per treatment guidelines derived from recent systematic review. Data was collected and analyzed.

RESULTS

Majority of the patients presented with fear of cancer rather than debilitating pain which would hinder with their activities of daily life. Conservative management with analgesics and breast support was useful in most of the patients. A subset of the patients

presented with pathologies requiring surgical treatment and they were offered those treatments and results evaluated.

INTERPRETATION AND CONCLUSION

Patient education and availability of quality radiological and pathological services are crucial in the management of patients with mastalgia in alleviating the fear of cancer among these women. Reassurance and appropriate medical and surgical treatment according to the cause of breast pain can reduce the morbidity and improve the outcome of the disease.

KEY WORDS

Mastalgia, breast pain, analgesics, breast support, cancer fear.

CONTENTS

INTRODUCTION

Mastalgia is the most common breast symptom in patients attending a breast clinic [1]. Approximately 60 to 70 % of women experience some degree of breast pain at some stages of their lives, and in 10 to 20 % of cases, it is severe [2, 3]. The two most common concerns of patients presenting with mastalgia are: the fear of breast cancer and the presence of severe pain affecting quality of life. The majority of patients with mastalgia can be managed with reassurance and simple drugs. The most important responsibility of the breast specialist is to convincingly rule out cancer and assiduously reassure the patient. Mastalgia is often associated with breast nodu-larity that may be tender or without a discrete lump. Some amount of breast nodularity and mastalgia are found in normal population [3, 4].

OBJECTIVES

The purpose of this dissertation is to analyse the various epidemiological, clinical, radiological and pathological facets of breast diseases presenting as mastalgia in women in a tertiary referral institute in south india .

The study period is between July 2015 to September 2015.

1) To evaluate and manage the different causes of breast pain according to recently published evidence.

2) To describe the breast pathologies we treat and compare outcomes.

3) To identify measures to decrease anxiety and morbidity attributed to this clinical problem.

REVIEW OF LITERATURE

Mastalgia is the most common breast symptom in patients attending a breast clinic [1]. Approximately 60 to 70 % of women experience some degree of breast pain at some stages of their lives, and in 10 to 20 % of cases, it is severe [2, 3]. The two most common concerns of patients presenting with mastalgia are: the fear of breast cancer and the presence of severe pain affecting quality of life. The majority of patients with mastalgia can be managed with reassurance and simple drugs. The most important responsibility of the breast specialist is to convincingly rule out cancer and assiduously reassure the patient. Mastalgia is often associated with breast nodularity that may be tender or without a discrete lump. Some amount of breast nodularity and mastalgia are found in normal population [3, 4].

CLASSIFICATION OF BREAST PAIN

CYCLICAL MASTALGIA

Cyclical breast pain occurs 1 to 2 weeks prior to menses. The pain is commonly felt diffusely and bilaterally, with some radiation to the upper arm and axilla. It can be more severe in one breast than the other and it is relieved by the onset of menstrual flow. These patients are usually aged between 30 and 40. Cyclical mastalgia may have spontaneous resolution in up to 22 % of patients and persists in up to 65 % of patients after treatment [4]. However, it can resolve with a hormonal event such as pregnancy or menopause, and because of this, it is postulated that cyclical mastalgia is due to hormonal stimulation of breast parenchyma particularly at the end of the luteal phase of the menstrual cycle [5]. For many, it may be a lifelong suffering to abate at menopause if left untreated [4].

Noncyclical Mastalgia It is usually unilateral and localized to a particular quadrant of the breast. Patients are usually older, in their 40s or 50s, and are often perimenopausal [5]. There are several causes of noncyclical mastalgia including cysts, periductal mastitis, stretching of Cooper’s ligaments, traumatic fat necrosis, Mondor’s disease, diabetic mastopathy, and neoplasia [3, 5].

Noncyclical mastalgia can resolve without treatment in up to 50 % of cases but can also be more difficult to treat [3].

Finally, non-breast pain can mimic mastalgia. Common causes of chest wall pain include costochondritis (Teitze's disease), referred nerve root pain as in cervical spondylitis, and herpes zoster. Non-chest wall pain can arise from diverse causes such as ischemic heart disease, biliary pain, and peptic ulcer [5, 6].

ETIOLOGY OF MASTALGIA

ENDOCRINE ABNORMALITIES

Three main theories have emerged regarding etiology of painful nodular breasts:

a. Increased estrogen secretion from the ovary

b. Deficient progesterone production

c. Hyperprolactinemia

The studies of serum hormones levels do not support the first two theories, as hormonal levels were found to be similar in patients and controls [7]; however, study from France showed a significantly depressed level of luteal progesterone, thus supporting the second theory [8].

Peters et al. found that the patients with mastalgia had a significantly greater rise in prolactin compared with the controls [9]. A study at Cardiff Mastalgia Clinic also reported a rise in stimulated prolactin level in women with mastalgia [10].

WATER RETENTION

At the Cardiff Mastalgia Clinic, the total body water was estimated using radioactive water (D2O) in mastalgia patients and asymptomatic normal women. The results showed that there were no significant differences in water gain between the 5th and 25th days of menstrual cycle in mastalgia patients compared to normal controls [10]. So it was concluded that simple retention of body water was not associated with breast pain [11].

PSYCHONEUROSIS

Astley Copper suggested that mastalgia patients were neurotic. Using Middlesex Hospital Questionnaire (MHQ), psycho-neurotic profiles of 300 patients with mastalgia'(cyclical and noncyclical) and 156 patients with varicose veins were tested. The MHQ scores of mastalgia patients were significantly lower than those of psychiatric patients, thus showing no component of psychoneurosis in occurrence of mastalgia [12].

CAFFEINE AND METHYLXANTHINE

It is suggested that overstimulation of breast cells may occur due to interference with adenosine triphosphate degradation by methylxanthine. Minton et al. reported that caffeine restriction produced improvement in symptoms; however, these studies were uncontrolled [13]. Subsequent random- ized trials have failed to demonstrate a benefit of caffeine restriction in relieving mastalgia [14].

MISCELLANEOUS FACTORS

Peters et al. observed that breast pain was associated positively with degree of ductal dilatation, as demonstrated by ultrasound scan [15].

CLINICAL ASSESSMENT AND INVESTIGATIONS

A history and examination will point to the diagnosis in most cases. A prospective pain diary is extremely helpful, as patient's recollection of events can be inaccurate and incomplete.

Investigations A mammogram should be performed for women aged 35 years and above. Ultrasound examination is helpful if there is a clinical palpable abnormality or if the patient presents with localized noncyclical pain. Ultrasound of the whole breast may be performed depending on the expertise and resources available to

the treating physician. Frequently reported cysts and other benign lesions on X-ray mammogram and ultrasound should not worry the patients unnecessarily in the absence of a discretely palpable lump. Other investigations may be necessary to complete the "triple test" if a lump is present such as image-guided breast biopsy of any suspicious lesion or cytology of serous or bloody nipple discharge.

MANAGEMENT

The following measures can be applied to both noncyclical and cyclical mastalgia.

DAILY BREAST PAIN CHARTING

Patients are explained about hormonal changes with menstruation and its relation with mastalgia and requested to record their daily pain experience on a chart (Fig. 1). The days with menses are marked with letter "P" (Fig. 2).

The severity of pain is also noted on a visual analogue scale (VAS, also called visual linear analogue). VAS is usually a horizontal line, 10 cm in length, anchored by word descriptors at each end (Fig. 3). The patient marks on the line below, the point that they feel represents their perception of pain. The VAS score is determined by measuring in millimeter from the left hand end of the line to the point that the patient marks. On this VAS, the 0

indicates no pain and 10 indicate very severe excruciating pain in the breast.

Most mastalgia experts consider any pain of ≥3 on a VAS of 0 to 10 to be significantly severe to require therapy [16]. Reassurance

A woman who has no abnormality detected on clinical assessment and triple test can be reassured that the possibility of an undetected breast malignancy is less than 5 %. Majority of women feel comfortable and at ease once cancer is ruled out [5].

Physical measures: It is estimated that up to 70 % of women wear improperly fitted bras. Thus, it is important to ensure that the patient is fitted with sufficiently sup- portive and well-fitting brassiere [17]. It is especially useful in women endowed with large mammary glands. In a randomized trial of 200 women with mastalgia, 100 women received treatment with danazol and the other 100 were asked to wear sports brassieres for 12 weeks. The danazol group had 58 % relief of symptoms (with drug side effects in 42 %), while in the brassiere group, 85 % had relief of symptoms with improved lifestyle [17]. Sports garments relieve pain by reducing the over- stretching of the Cooper's ligament.

Relaxation techniques: Four weeks of relaxation therapy was reported to provide relief in 60 % of patients [18].

Vitamins: There is no convincing evidence to support the use of vitamins in treatment of mastalgia; however, vitamin B1, B6, and E are all used by clinicians. These have no role and should not be misused [23]. A recent meta-analysis described that long-term use of vitamin E may increase risk of hemorrhagic stroke (RR= 1.22; 95 % confidence interval 1 to 1.48; p=0.045) [19].

Evening primrose oil: Although evening primrose oil has been used in past with some success in a few trials [20, 21], meta-analysis revealed that the benefit in pain reduction is similar to that achieved by placebo [22]. But some centers still prefer to use evening primrose oil for breast pain.

SIMPLE MEDICATIONS

Nonsteroidal anti-inflammatory medications can be effective in up to 80 % of women and their usefulness is often underestimated. Diclofenac gel applied as local massage to painful areas of breast has been found to be more effective than placebo gel and ibuprofen gel in randomized trials [23]. Colak studied the effects of topical diclofenac gel on cyclic and noncyclical mastalgia

in 108 patients: 60 with cyclic (group I) and 48 with noncyclical (group II). Patients within each group were randomized to diclofenac gel or placebo cream, three times daily for 6 months. The pain score decreased significantly in diclofenac gel group compared to placebo. The benefit was seen in both cyclical and non-cyclical breast pain. No side effect was reported in any group [23].

FIG. 1 A DAILY BREAST PAIN CHART

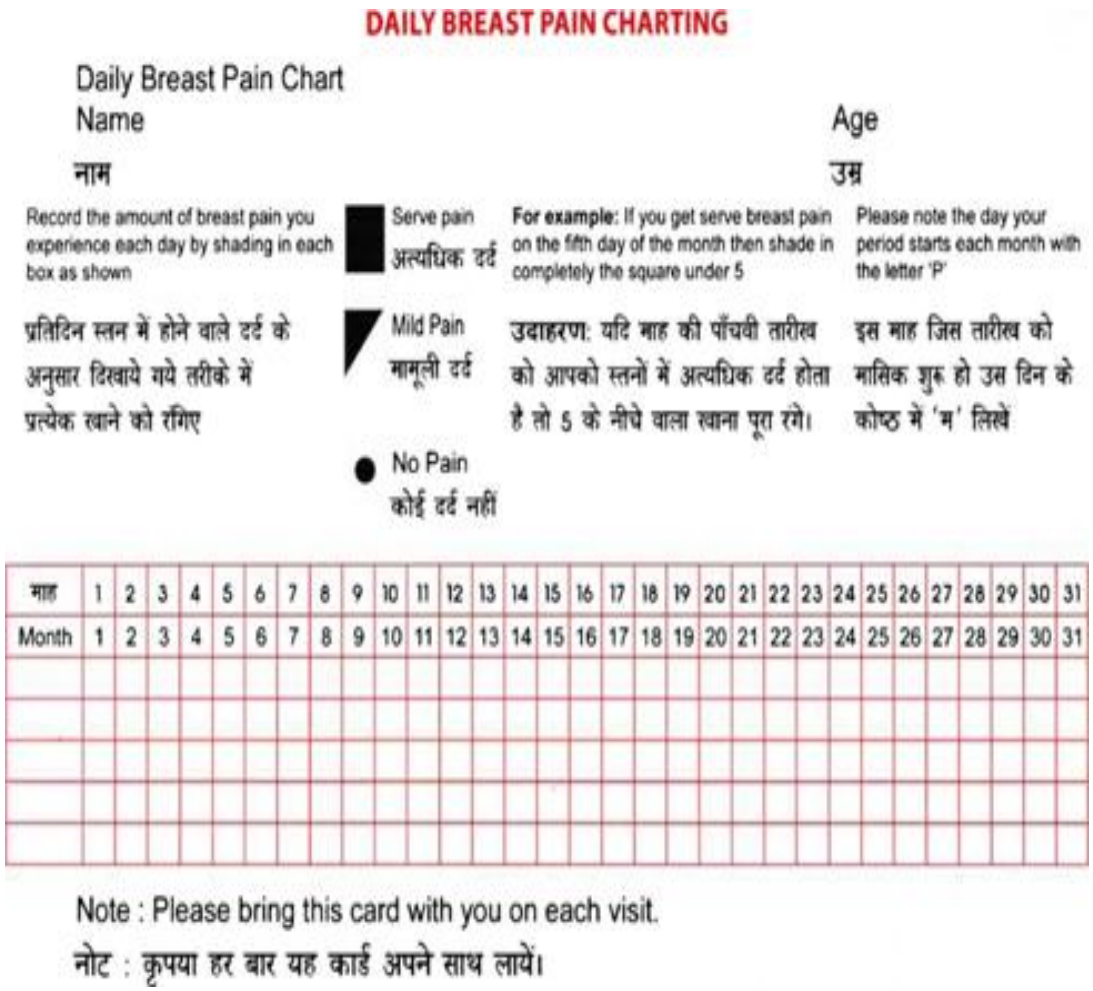
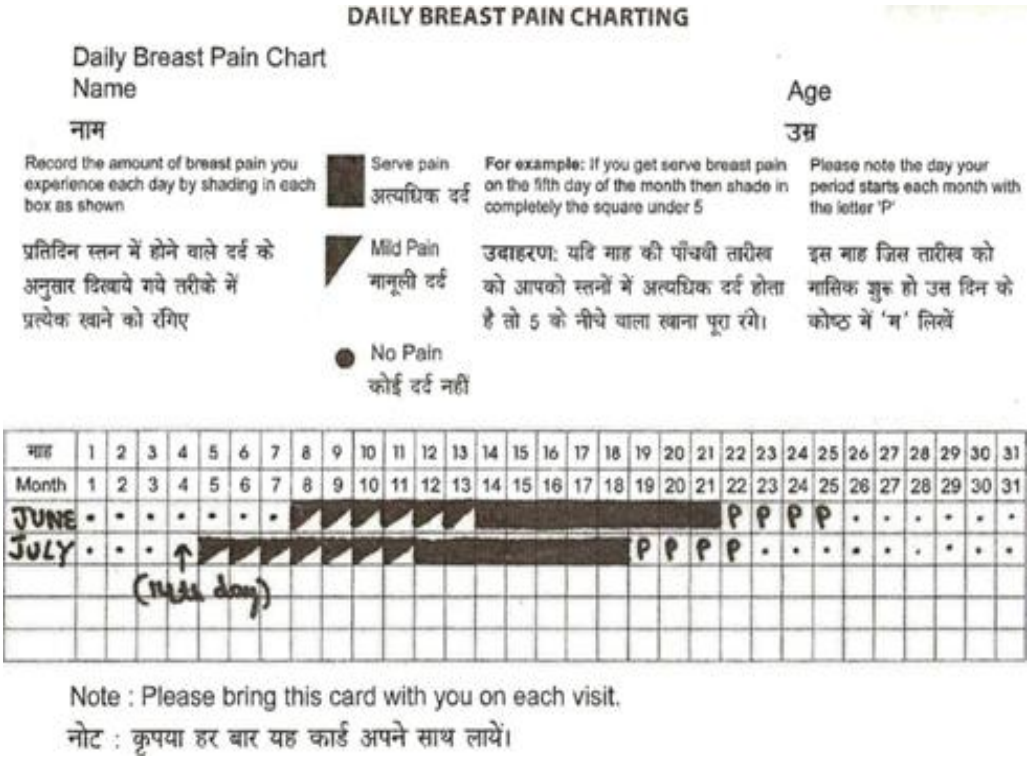


FIG. 2 A TYPICAL PAIN PATTERN OF CYCLICAL MASTALGIA WITH PREMENSTRUAL EXACERBATION



HORMONE REPLACEMENT THERAPY AND BREAST PAIN

The response of oral contraceptives and hormone replace- ment therapy (HRT) on breast pain is variable in differ- ent individuals. While some women may develop breast pain on starting oral pills or HRT, others may feel relieved of their mastalgia with these medications. Stud- ies of low-dose oral contraceptives (20 μg ethinyl estra- diol) have found no increase in breast symptoms compared with placebo [24].

Topical, oral, and parenteral progestogens have been studied for treatment of breast pain with variable results. The oral

progestogens, lynestrenol, and promegestone administered during the luteal phase significantly improved breast pain in 66 to 80 % of women [25, 26]. No systematic review or RCTs could be found to assess the effects of HRT for treating mastalgia. HRT usually increases the risk of breast pain; hence, no trial on HRT for therapy of mastalgia has been conducted. Due to the risk of side effects, hormonal medications should only be used for 2 to 6-month periods.

Tamoxifen: Tamoxifen at a dose of 10 mg daily is reported to relieve cyclical mastalgia in 70 to 90 % and noncyclical mastalgia in 56 % of cases. Side effects at this low dose for 3 months are minimal and include irregular periods and hot flushes. Tamoxifen is the drug of choice for mastalgia in most breast clinics in the West [27]. The patient must be told that tamoxifen is not being given for cancer.

Centchroman: Centchroman or ormeloxifene (marketed as SAHELI by Hindustan latex company India) is a nonsteroidal antiestrogen agent. It is used as “once a week contraceptive pill” which selectively binds with estrogen receptor in the breast and endometrium. This molecule was developed at the Central Drug Research Institute, Lucknow. At the All India Institute of Medical

Sciences breast clinic, centchroman has been used for control of mastalgia. Initially a dosage of 30 mg on alternate days was employed in 19 patients. The frequency of dosage was later increased to once daily, as there were no major side effects seen and some women missed doses with alternate day therapy. Hence to improve compliance and effect, in latter part of study, it was given as 30 mg once a day to 23 patients.

In a randomized trial of 81 patients (42 randomized to centchroman and 39 to danazol), combining both alternate and daily dosage, centchroman was found to have response of 89.7 % (response being defined as number of women achieving reduction of pain to less than or equal to 3 on VAS of 0 to 10) whereas cases receiving danazol achieved a response of 69.4 % at 12 weeks of therapy [28].

A greater proportion of women in centchroman group continue to enjoy pain-free life even after the drug was stopped, suggesting a longer carry over effect. It is also cheaper than tamoxifen [29]. Moreover, there are no reports of endometrial carcinoma or thromboembolic side effects with long-term use of centchroman as compared to tamoxifen [30]. Patients should be

actively informed that centchroman is not being used for contraceptive purpose.

FIG. 3 A "VISUAL LINEAR ANALOGUE SCALE FOR MEASURING PAIN

Danazol: It is an antigonadotrophin agent. Danazol is a testosterone derivative and has mild androgenic effect [31]. Current practice in India is to start treatment at 50 mg once daily and then increase to 50 mg twice daily if the response is not complete. The maintenance dose should be given for at least 3 months [32]. In the West, the recommendation is to use a maintenance dose of 100 mg daily or alternate days. The common side effects with danazol are hair growth, weight gain, and menstru- al irregularities; hence its use should be reserved for cases of severe mastalgia who have failed on 3–6 months of tamoxifen and centchroman treatment. It is contra- indicated during pregnancy due to possible teratogenic effect [33, 34].

Gamma lenolenic acid (GLA): An essential polyunsaturated fatty acid is present in large quantities in evening prim- rose oil.

Women with cyclical mastalgia have been found to have low levels of the metabolites of GLA in the plasma. A multicenter study randomized patients into four groups: (1) GLA and antioxidants, (beta carotene, vitamin c, vitamin B6, zinc, and niacin); (2) placebo, fatty acid, and antioxidants; (3) GLA and placebo antioxidants; and (4) placebo fatty acids. The investigators concluded that GLA efficacy was similar to placebo, regardless of whether antioxidant vitamins were added or not [35].

Bromocriptine: It is a dopamine agonist and stimulates the dopaminergic receptors in the anterior pituitary and blocks the release of prolactin. It is administered at a dose of 2.5 mg twice daily, about 47 to 88 % of patients are reported to have a significant long-lasting relief in breast pain. In a meta-analysis, bromocriptine was found to offer a reduction in mean pain score of 16.31 as compared to placebo [22]. Most mastalgia experts have stopped using bromocriptine because of severe side effects, the commonest being nausea, vomiting, and dizziness.

Lisuride maleate: It is an ergot derivative. It is a dopamine agonist which binds to prolactin receptors. A double blind placebo-controlled randomized study evaluated lisuride therapy for mastalgia at a dose of 0.2 mg/day and found it to be an effective

and well-tolerated treatment. Its key advantage over bromocriptine is the lower prevalence of side effects with lisuride [36]. It is not widely used and should be used with caution as it has been associated with pathological gambling and hypersexuality.

Goserelin (LHRH analog): Goserelin in a placebo- controlled randomized trial of 147 premenopausal cases showed a significant reduction in mean days with severe pain from 17.6 to 5.9, i.e., 67 % reduction [37]. It is effective in recurrent mastalgia and mastalgia not responding to other hormonal therapies.

Trigger point pain: In some women, pain is localized to one tiny spot of the breast. If imaging of breast does not reveal any organic lesion, this trigger point may be treated by injection of lignocaine 2 % (2 ml) followed by an injection of long-acting steroid (e.g., triamcinalone acetate 1 ml solution).

Surgery: There is very limited role for surgery in treat- ment of mastalgia. Surgery can be useful in selected patients with a discrete, small trigger spot whose symp- toms may be relieved by excision of spot [38]. For generalized mastalgia, mastectomy is not advised. If patient insist on mastectomy, a careful psychological assessment is advised prior to agreeing to surgery [39]. Patients

should be informed of possible complications inherent of reconstructive surgery and warned that in 50 % cases their pain will not be improved [40]. Decision of surgery in mastalgia is a bilateral one after extremely careful and repeated observations usually on the insistence of the patient.

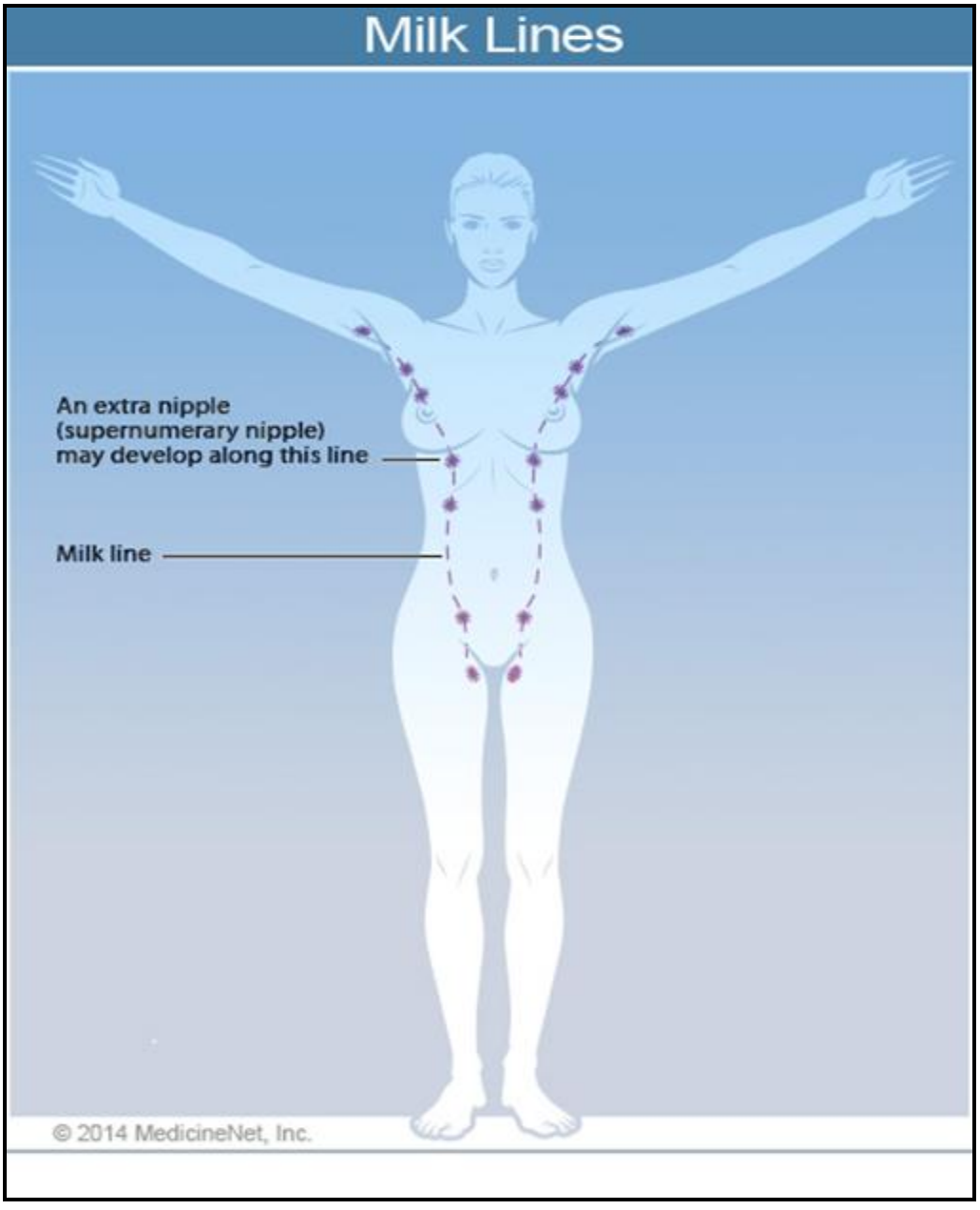
EMBRYOLOGY OF BREAST

At the fifth or sixth week of fetal development, two ventral bands of thickened ectoderm (mammary ridges, milk lines) are evident in the embryo.41 In most mammals, paired breasts develop along these ridges, which extend from the base of the forelimb (future axilla) to the region of the hind limb (inguinal area). These ridges are not prominent in the human embryo and disappear after a short time, except for small portions that may persist in the pectoral region.

Each breast develops when an ingrowth of ectoderm forms a primary tissue bud in the mesenchyme. The primary bud, in turn, initiates the development of 15 to 20 secondary buds. Epithelial cords develop from the secondary buds and extend into the surrounding mesenchyme. Major (lactiferous) ducts develop, which open into a shallow mammary pit. During infancy, a proliferation of mesenchyme transforms the mammary pit into a nipple. The breast

remains undeveloped in the female until puberty, when it enlarges in response to ovarian estrogen and progesterone, which initiate proliferation of the epithelial and connective tissue elements. However, the breasts remain incompletely developed until pregnancy occurs.

FIG 4. MILK LINES

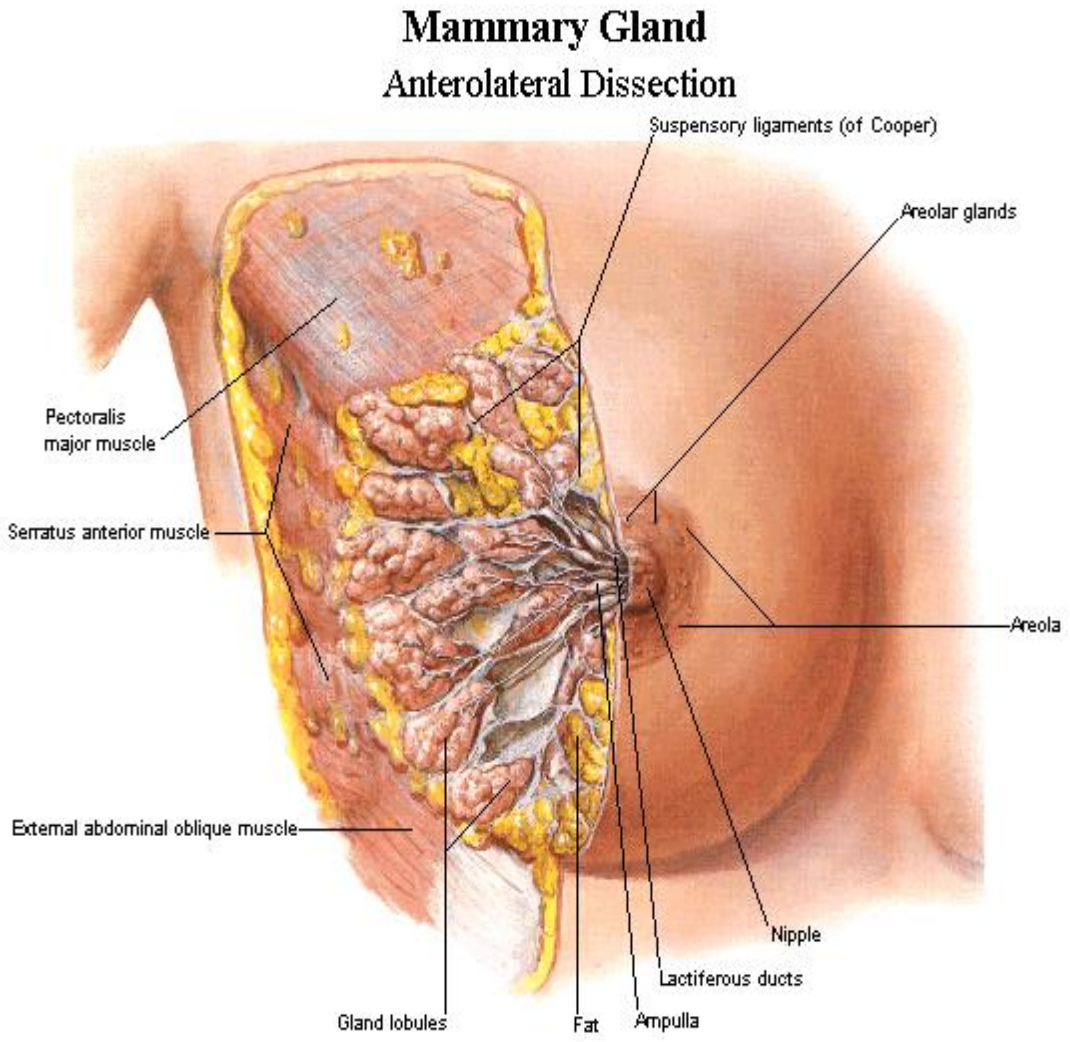


FUNCTIONAL ANATOMY OF BREAST

The breast is composed of 15 to 20 lobes which are each composed of several lobules.42 Fibrous bands of connective tissue travel through the breast (Cooper's suspensory ligaments), insert perpendicularly into the dermis, and provide structural support. The mature female breast extends from the level of the second or third rib to the inframammary fold at the sixth or seventh rib. It extends transversely from the lateral border of the sternum to the anterior axillary line. The deep or posterior surface of the breast rests on the fascia of the pectoralis major, serratus anterior, and external oblique abdominal muscles, and the upper extent of the rectus sheath. The retromammary bursa may be identified on the posterior aspect of the breast between the investing fascia of the breast and the fascia of the pectoralis major muscles. The axillary tail of Spence extends laterally across the anterior axillary fold. The upper outer quadrant of the breast contains a greater volume of tissue than do the other quadrants. The breast has a protuberant conical form. The base of the cone is roughly circular, measuring 10 to 12 cm in diameter. Considerable variations in the size, contour, and density of the breast are evident among individuals.

nulliparous breast has a hemispheric configuration with distinct flattening above the nipple. With the hormonal stimulation that accompanies pregnancy and lactation, the breast becomes larger and increases in volume and density, whereas with senescence, it assumes a flattened, flaccid, and more pendulous configuration with decreased volume.

FIG 5. ANATOMY OF BREAST



NIPPLE-AREOLA COMPLEX

The epidermis of the nipple-areola complex is pigmented and is variably corrugated. During puberty, the pigment becomes darker and the nipple assumes an elevated configuration. During pregnancy, the areola enlarges and pigmentation is further enhanced. The areola contains sebaceous glands, sweat glands, and accessory glands, which produce small elevations on the surface of the areola (Montgomery's tubercles). Smooth muscle bundle fibers, which lie circumferentially in the dense connective tissue and longitudinally along the major ducts, extend upward into the nipple, where they are responsible for the nipple erection that occurs with various sensory stimuli. The dermal papilla at the tip of the nipple contains numerous sensory nerve endings and Meissner's corpuscles. This rich sensory innervation is of functional importance, because the sucking of the infant initiates a chain of neurohumoral events that results in milk letdown.

INACTIVE AND ACTIVE BREAST

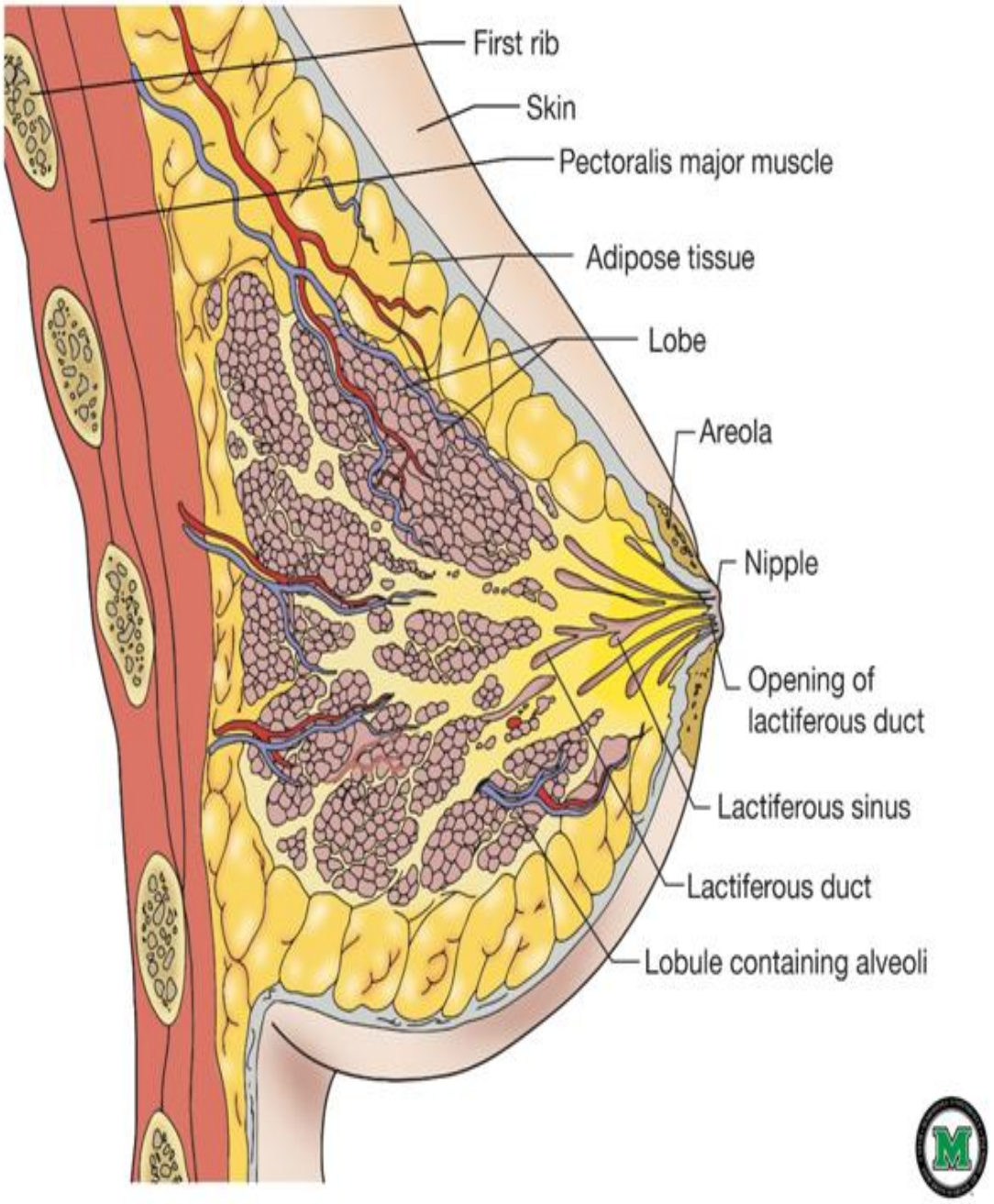
Each lobe of the breast terminates in a major (lactiferous) duct (2 to 4 mm in diameter), which opens through a constricted orifice (0.4 to 0.7 mm in diameter) into the ampulla of the nipple. Immediately below the nipple-areola complex, each major duct has

a dilated portion (lactiferous sinus), which is lined with stratified squamous epithelium. Major ducts are lined with two layers of cuboidal cells, whereas minor ducts are lined with a single layer of columnar or cuboidal cells. Myoepithelial cells of ectodermal origin reside between the epithelial cells in the basal lamina and contain myofibrils. In the inactive breast, the epithelium is sparse and consists primarily of ductal epithelium. In the early phase of the menstrual cycle, minor ducts are cord-like with small lumina. With estrogen stimulation at the time of ovulation, alveolar epithelium increases in height, duct lumina become more prominent, and some secretions accumulate. When the hormonal stimulation decreases, the alveolar epithelium regresses. With pregnancy, the breast undergoes proliferative and developmental maturation.

As the breast enlarges in response to hormonal stimulation, lymphocytes, plasma cells, and eosinophils accumulate within the connective tissues. The minor ducts branch and alveoli develop. Development of the alveoli is asymmetric, and variations in the degree of development may occur within a single lobule. With parturition, enlargement of the breasts occurs via hypertrophy of alveolar epithelium and accumulation of secretory products in the lumina of the minor ducts. Alveolar epithelium contains abundant

endoplasmic reticulum, large mitochondria, Golgi complexes, and dense lysosomes. Two distinct substances are produced by the alveolar epithelium: (a) the protein component of milk, which is synthesized in the endoplasmic reticulum (merocrine secretion); and (b) the lipid component of milk (apocrine secretion), which forms as free lipid droplets in the cytoplasm. Milk released in the first few days after parturition is called colostrum and has low lipid content but contains considerable quantities of antibodies. The lymphocytes and plasma cells that accumulate within the connective tissues of the breast are the source of the antibody component. With subsequent reduction in the number of these cells, the production of colostrum decreases and lipid-rich milk is released.

FIG 6. ANATOMY OF BREAST-SAGITTAL SECTION



BLOOD SUPPLY, INNERVATION, AND LYMPHATICS

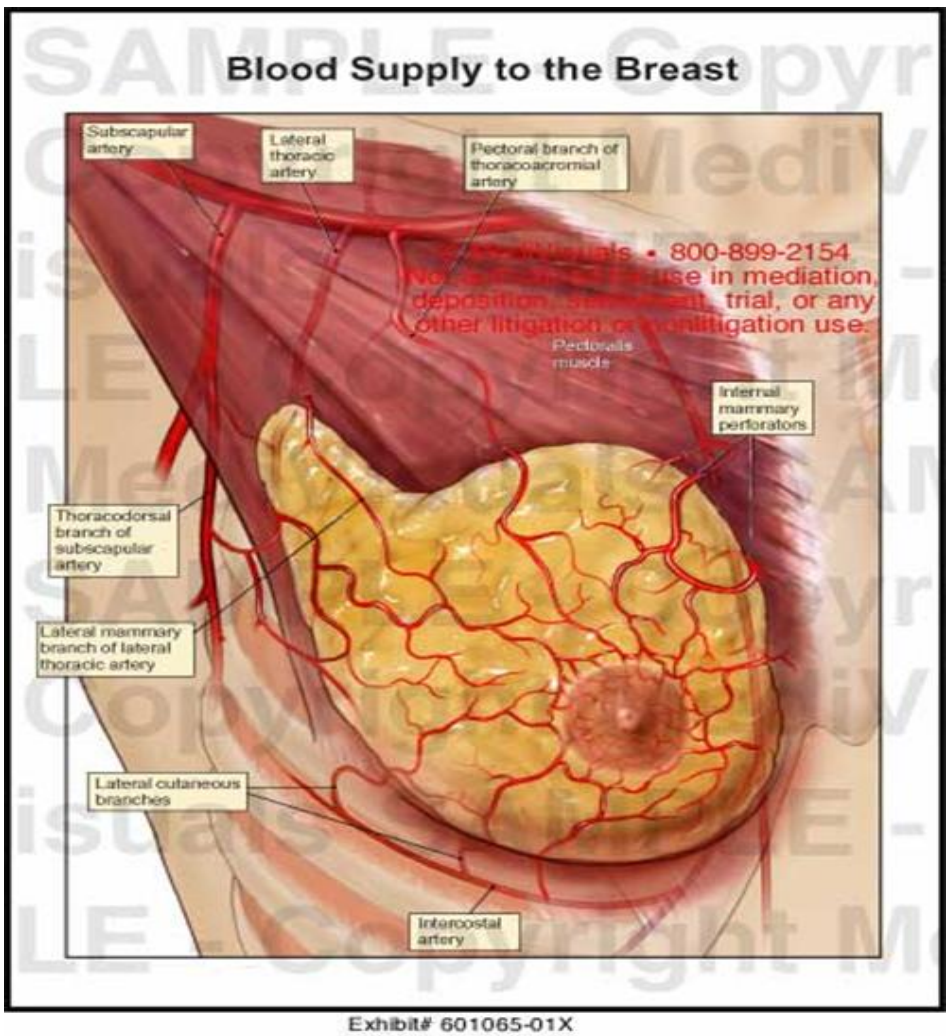
The breast receives its principal blood supply from (a) perforating branches of the internal mammary artery; (b) lateral branches of the posterior intercostal arteries; and (c) branches from

the axillary artery, including the highest thoracic, lateral thoracic, and pectoral branches of the thoracoacromial artery. The second, third, and fourth anterior intercostal perforators and branches of the internal mammary artery arborize in the breast as the medial mammary arteries. The lateral thoracic artery gives off branches to the serratus anterior, pectoralis major and pectoralis minor, and subscapularis muscles. It also gives rise to lateral mammary branches. The veins of the breast and chest wall follow the course of the arteries, with venous drainage being toward the axilla. The three principal groups of veins are (a) perforating branches of the internal thoracic vein, (b) perforating branches of the posterior intercostal veins, and (c) tributaries of the axillary vein. Batson's vertebral venous plexus, which invests the vertebrae and extends from the base of the skull to the sacrum, may provide a route for breast cancer metastases to the vertebrae, skull, pelvic bones, and central nervous system. Lymph vessels generally parallel the course of blood vessels.

Lateral cutaneous branches of the third through sixth intercostal nerves provide sensory innervation of the breast (lateral mammary branches) and of the anterolateral chest wall. These branches exit the intercostal spaces between slips of the serratus

anterior muscle. Cutaneous branches that arise from the cervical plexus, specifically the anterior branches of the supraclavicular nerve, supply a limited area of skin over the upper portion of the breast. The intercostobrachial nerve is the lateral cutaneous branch of the second intercostal nerve and may be visualized during surgical dissection of the axilla. Resection of the intercostobrachial nerve causes loss of sensation over the medial aspect of the upper arm.

FIG 7. BLOOD SUPPLY OF BREAST



The boundaries for lymph drainage of the axilla are not well demarcated, and there is considerable variation in the position of the axillary lymph nodes. The six axillary lymph node groups recognized by surgeons (are (a) the axillary vein group (lateral), which consists of four to six lymph nodes that lie medial or posterior to the vein and receive most of the lymph drainage from the upper extremity; (b) the external mammary group (anterior or pectoral group), which consists of five or six lymph nodes that lie along the lower border of the pectoralis minor muscle contiguous with the lateral thoracic vessels and receive most of the lymph drainage from the lateral aspect of the breast; (c) the scapular group (posterior or subscapular), which consists of five to seven lymph nodes that lie along the posterior wall of the axilla at the lateral border of the scapula contiguous with the subscapular vessels and receive lymph drainage principally from the lower posterior neck, the posterior trunk, and the posterior shoulder; (d) the central group, which consists of three or four sets of lymph nodes that are embedded in the fat of the axilla lying immediately posterior to the pectoralis minor muscle and receive lymph drainage both from the axillary vein, external mammary, and scapular groups of lymph nodes, and directly from the breast;

(e) the subclavicular group (apical), which consists of six to twelve sets of lymph nodes that lie posterior and superior to the upper border of the pectoralis minor muscle and receive lymph drainage from all of the other groups of axillary lymph nodes; and (f) the interpectoral group (Rotter's nodes), which consists of one to four lymph nodes that are interposed between the pectoralis major and pectoralis minor muscles and receive lymph drainage directly from the breast. The lymph fluid that passes through the interpectoral group of lymph nodes passes directly into the central and subclavicular groups.

The lymph node groups are assigned levels according to their anatomic relationship to the pectoralis minor muscle. Lymph nodes located lateral to or below the lower border of the pectoralis minor muscle are referred to as level I lymph nodes, which include the axillary vein, external mammary, and scapular groups. Lymph nodes located superficial or deep to the pectoralis minor muscle are referred to as level II lymph nodes, which include the central and interpectoral groups. Lymph nodes located medial to or above the upper border of the pectoralis minor muscle are referred to as level III lymph nodes, which consist of the subclavicular group.

The plexus of lymph vessels in the breast arises in the interlobular connective tissue and in the walls of the lactiferous ducts and communicates with the subareolar plexus of lymph vessels. Efferent lymph vessels from the breast pass around the lateral edge of the pectoralis major muscle and pierce the clavipectoral fascia, ending in the external mammary (anterior, pectoral) group of lymph nodes. Some lymph vessels may travel directly to the subscapular (posterior, scapular) group of lymph nodes. From the upper part of the breast, a few lymph vessels pass directly to the subclavicular (apical) group of lymph nodes. The axillary lymph nodes usually receive >75% of the lymph drainage from the breast. The rest is derived primarily from the medial aspect of the breast, flows through the lymph vessels that accompany the perforating branches of the internal mammary artery, and enters the parasternal (internal mammary) group of lymph nodes.

FIG 8. INACTIVE BREAST

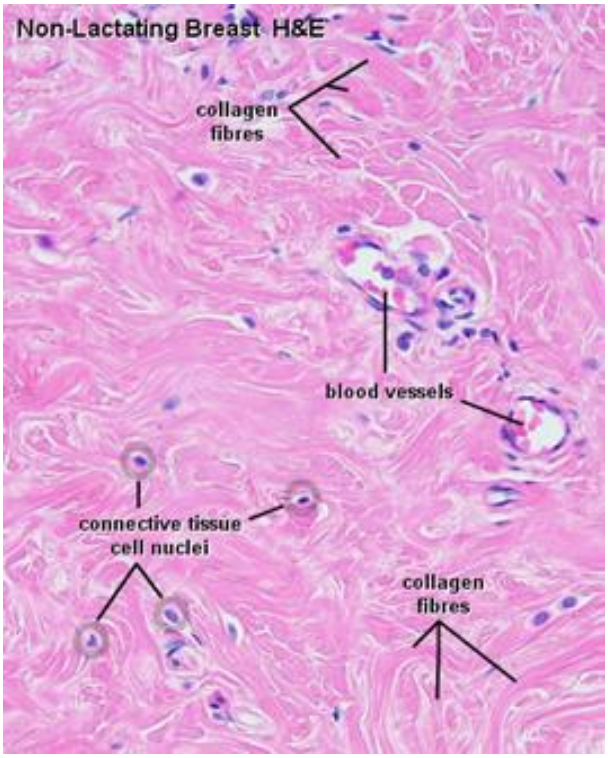
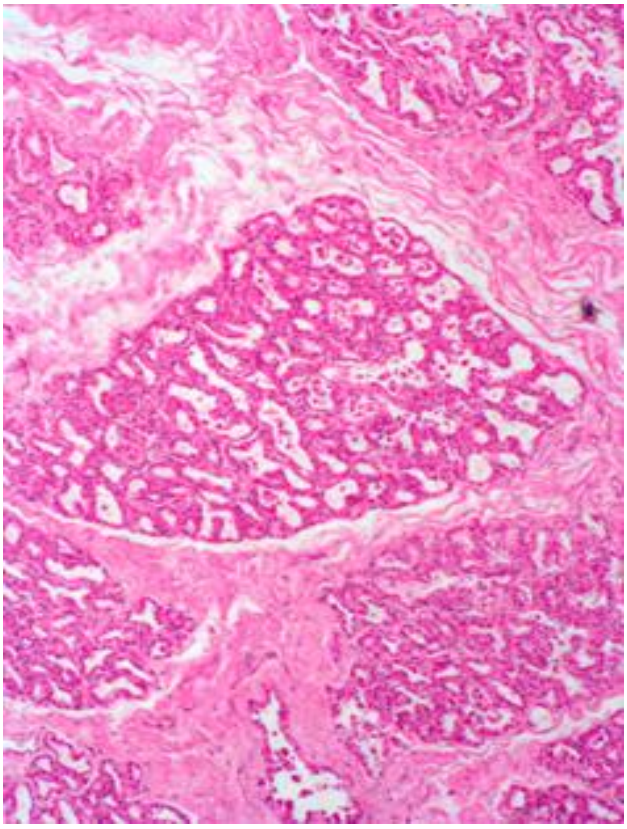


FIG 9. ACTIVE BREAST



PHYSIOLOGY OF THE BREAST

BREAST DEVELOPMENT AND FUNCTION

Breast development and function are initiated by a variety of hormonal stimuli, including estrogen, progesterone, prolactin, oxytocin, thyroid hormone, cortisol, and growth hormone.43,44 Estrogen, progesterone, and prolactin especially have profound trophic effects that are essential to normal breast development and function. Estrogen initiates ductal development, whereas progesterone is responsible for differentiation of epithelium and for lobular development. Prolactin is the primary hormonal stimulus for lactogenesis in late pregnancy and the postpartum period. It upregulates hormone receptors and stimulates epithelial development. Figure 10 depicts the secretion of neurotrophic hormones from the hypothalamus, which is responsible for regulation of the secretion of the hormones that affect the breast tissues. The gonadotropins luteinizing hormone (LH) and follicle-stimulating hormone (FSH) regulate the release of estrogen and progesterone from the ovaries. In turn, the release of LH and FSH from the basophilic cells of the anterior pituitary is regulated by the secretion of gonadotropin-releasing hormone (GnRH) from the hypothalamus. Positive and negative feedback effects of circulating

estrogen and progesterone regulate the secretion of LH, FSH, and GnRH. These hormones are responsible for the development, function, and maintenance of breast tissues. In the female neonate, circulating estrogen and progesterone levels decrease after birth and remain low throughout childhood because of the sensitivity of the hypothalamic-pituitary axis to negative feedback from these hormones. With the onset of puberty, there is a decrease in the sensitivity of the hypothalamic-pituitary axis to negative feedback and an increase in its sensitivity to positive feedback from estrogen. These physiologic events initiate an increase in GnRH, FSH, and LH secretion and ultimately an increase in estrogen and progesterone secretion by the ovaries, which leads to establishment of the menstrual cycle. At the beginning of the menstrual cycle, there is an increase in the size and density of the breasts, which is followed by engorgement of the breast tissues and epithelial proliferation. With the onset of menstruation, the breast engorgement subsides and epithelial proliferation decreases.

PREGNANCY, LACTATION, AND SENESCENCE

A dramatic increase in circulating ovarian and placental estrogens and progestins is evident during pregnancy, which initiates striking alterations in the form and substance of the breast.

43-45 The breast enlarges as the ductal and lobular epithelium proliferates, the areolar skin darkens, and the accessory areolar glands (Montgomery's glands) become prominent. In the first and second trimesters, the minor ducts branch and develop. During the third trimester, fat droplets accumulate in the alveolar epithelium and colostrum fills the alveolar and ductal spaces. In late pregnancy, prolactin stimulates the synthesis of milk fats and proteins.

After delivery of the placenta, circulating progesterone and estrogen levels decrease, which permits full expression of the lactogenic action of prolactin. Milk production and release are controlled by neural reflex arcs that originate in nerve endings of the nipple-areola complex. Maintenance of lactation requires regular stimulation of these neural reflexes, which results in prolactin secretion and milk letdown.

Oxytocin release results from the auditory, visual, and olfactory stimuli associated with nursing. Oxytocin initiates contraction of the myoepithelial cells, which results in compression of alveoli and expulsion of milk into the lactiferous sinuses. After weaning of the infant, prolactin and oxytocin release decreases. Dormant milk causes increased pressure within the ducts and

alveoli, which results in atrophy of the epithelium. With menopause there is a decrease in the secretion of estrogen and progesterone by the ovaries and involution of the ducts and alveoli of the breast. The surrounding fibrous connective tissue increases in density, and breast tissues are replaced by adipose tissues.

FIG 10. NEUROHUMORAL CONTROL OF BREAST FUNCTION

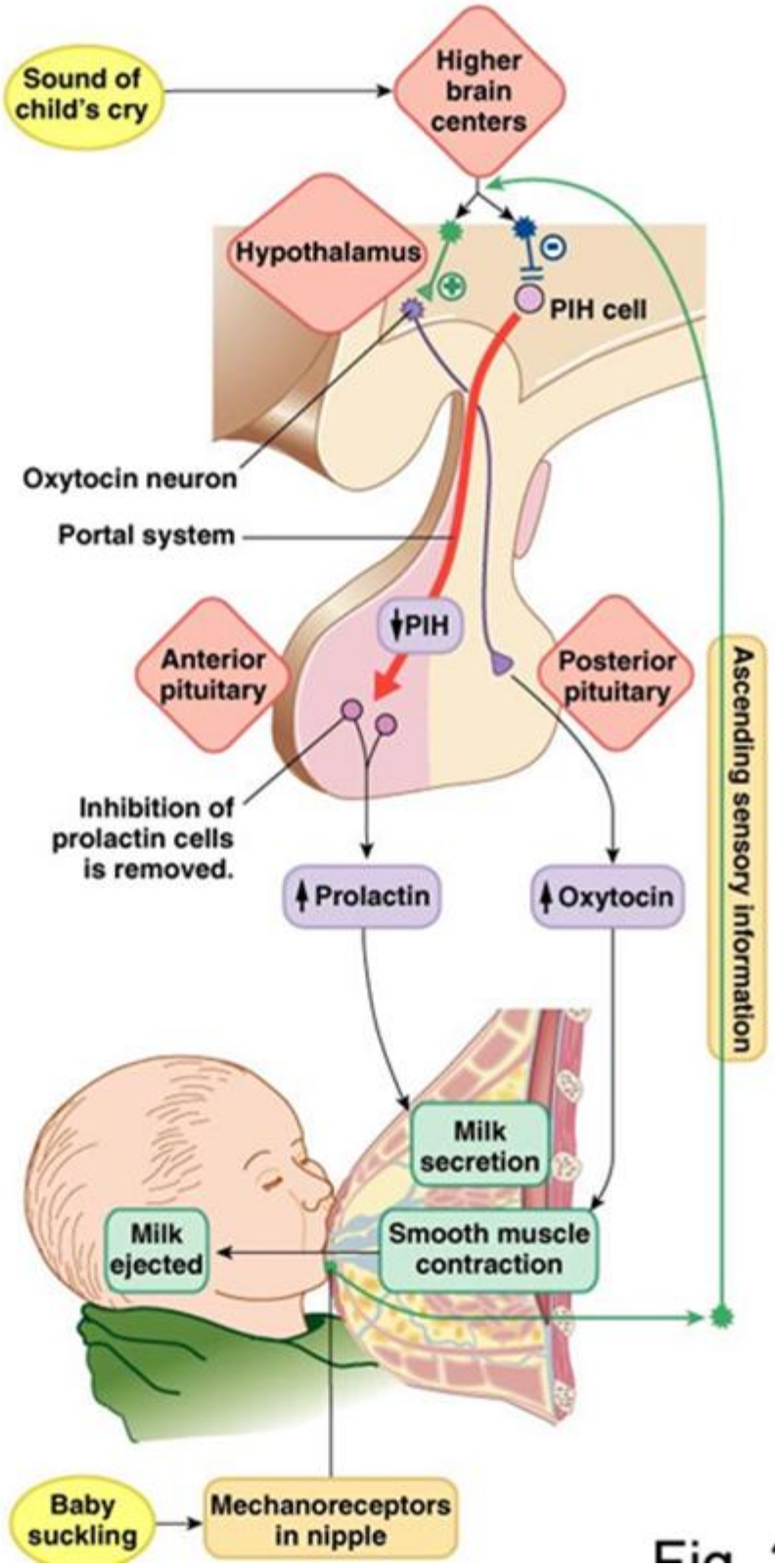


Fig. 26

INFECTIOUS AND INFLAMMATORY DISORDERS OF THE BREAST

Except during the postpartum period, infections of the breast are rare and are classified as intrinsic (secondary to abnormalities in the breast) or extrinsic (secondary to an infection in an adjacent structure, e.g., skin, thoracic cavity).

BACTERIAL INFECTION

Staphylococcus aureus and *Streptococcus* species are the organisms most frequently recovered from nipple discharge from an infected breast. Breast abscesses are typically seen in staphylococcal infections and present with point tenderness, erythema, and hyperthermia. These abscesses are related to lactation and occur within the first few weeks of breastfeeding. The progression of a staphylococcal infection, which may result in subcutaneous, subareolar, interlobular (periductal), and retromammary abscesses (unicentric or multicentric), necessitating operative drainage of fluctuant areas. Preoperative ultrasonography is effective in delineating the required extent of the drainage procedure, which is best accomplished via circumareolar incisions or incisions paralleling Langer's lines.

Although staphylococcal infections tend to be more localized and may be situated deep in the breast tissues, streptococcal infections usually present with diffuse superficial involvement. They are treated with local wound care, including application of warm compresses, and the administration of IV antibiotics (penicillins or cephalosporins). Breast infections may be chronic, possibly with recurrent abscess formation. In this situation, cultures are performed to identify acid-fast bacilli, anaerobic and aerobic bacteria, and fungi. Uncommon organisms may be encountered, and long-term antibiotic therapy may be required.

Biopsy of the abscess cavity wall is generally recommended at the time of incision and drainage to rule out underlying or coexisting breast cancer with necrotic tumor.

Hospital-acquired puerperal infections of the breast are much less common nowadays, but nursing women who present with milk stasis or noninfectious inflammation may still develop this problem. Epidemic puerperal mastitis is initiated by highly virulent strains of methicillin-resistant *S. aureus* that are transmitted via the suckling neonate and may result in substantial morbidity and occasional mortality.

Purulent fluid may be expressed from the nipple. In this circumstance, breastfeeding is stopped, antibiotics are started, and surgical therapy is initiated. *Nonepidemic (sporadic) puerperal mastitis* refers to involvement of the interlobular connective tissue of the breast by an infectious process. The patient develops nipple fissuring and milk stasis, which initiate a retrograde bacterial infection. Emptying of the breast using breast suction pumps shortens the duration of symptoms and reduces the incidence of recurrences. The addition of antibiotic therapy results in a satisfactory outcome in >95% of cases.

Zuska's disease, also called *recurrent periductal mastitis,* is a condition of recurrent retroareolar infections and abscesses.[48,49] This syndrome is managed symptomatically, by antibiotics coupled with incision and drainage as necessary. Attempts to obtain durable long-term control by wide débridement of chronically infected tissue and/or terminal duct resection are frequently frustrated by postoperative infections. Smoking has been implicated as a risk factor for this condition.

MYCOTIC INFECTIONS

Fungal infections of the breast are rare and usually involve blastomycosis or sporotrichosis.[47] Intraoral fungi that are

inoculated into the breast tissue by the suckling infant initiate these infections, which present as mammary abscesses in close proximity to the nipple-areola complex. Pus mixed with blood may be expressed from sinus tracts. Antifungal agents can be administered for the treatment of systemic (noncutaneous) infections. This therapy generally eliminates the necessity of surgical intervention, but occasionally drainage of an abscess, or even partial mastectomy, may be necessary to eradicate a persistent fungal infection. *Candida albicans* affecting the skin of the breast presents as erythematous, scaly lesions of the inframammary or axillary folds. Scrapings from the lesions demonstrate fungal elements (filaments and binding cells). Therapy involves the removal of predisposing factors such as maceration and the topical application of nystatin.

HIDRADENITIS SUPPURATIVA

Hidradenitis suppurativa of the nipple-areola complex or axilla is a chronic inflammatory condition that originates within the accessory areolar glands of Montgomery or within the axillary sebaceous glands.[47] Women with chronic acne are predisposed to developing hidradenitis. When located in and about the nipple-areola complex, this disease may mimic other chronic inflammatory

states, Paget's disease of the nipple, or invasive breast cancer. Involvement of the axillary skin is often multifocal and contiguous. Antibiotic therapy with incision and drainage of fluctuant areas is appropriate treatment. Excision of the involved areas may be required. Large areas of skin loss may necessitate coverage with advancement flaps or split-thickness skin grafts.

MONDOR'S DISEASE

Mondor's disease is a variant of thrombophlebitis that involves the superficial veins of the anterior chest wall and breast.[50] In 1939, Mondor described the condition as "string phlebitis," a thrombosed vein presenting as a tender, cord-like structure.[51] Frequently involved veins include the lateral thoracic vein, the thoracoepigastric vein, and, less commonly, the superficial epigastric vein. Typically, a woman presents with acute pain in the lateral aspect of the breast or the anterior chest wall. A tender, firm cord is found to follow the distribution of one of the major superficial veins. Rarely, the presentation is bilateral, and most women have no evidence of thrombophlebitis in other anatomic sites. This benign, self-limited disorder is not indicative of a cancer. When the diagnosis is uncertain, or when a mass is present near the tender cord, biopsy is indicated. Therapy for Mondor's

disease includes the liberal use of anti-inflammatory medications and application of warm compresses along the symptomatic vein. Restriction of motion of the ipsilateral extremity and shoulder as well as brassiere support of the breast are important. The process usually resolves within 4 to 6 weeks. When symptoms persist or are refractory to therapy, excision of the involved vein segment is appropriate.

COMMON BENIGN DISORDERS AND DISEASES OF THE BREAST

Benign breast disorders and diseases encompass a wide range of clinical and pathologic entities. Surgeons require an in-depth understanding of benign breast disorders and diseases so that clear explanations may be given to affected women, appropriate treatment instituted, and unnecessary long-term follow up avoided.

ABERRATIONS OF NORMAL DEVELOPMENT AND INVOLUTION

The basic principles underlying the aberrations of normal development and involution (ANDI) classification of benign breast conditions are the following: (a) benign breast disorders and diseases are related to the normal processes of reproductive life and to involution; (b) there is a spectrum of breast conditions that ranges from normal to disorder to disease; and (c) the ANDI

classification encompasses all aspects of the breast condition, including pathogenesis and the degree of abnormality.[52] The horizontal component of Table 17-3 defines ANDI along a spectrum from normal, to mild abnormality (disorder), to severe abnormality (disease). The vertical component indicates the period during which the condition develops.

TABLE 17-3 ANDI CLASSIFICATION OF BENIGN BREAST DISORDERS

	Normal	Disorder	Disease
Early reproductive years (age 15–25 y)	Lobular development	Fibroadenoma	Giant fibroadenoma
	Stromal development	Adolescent hypertrophy	Gigantomastia
	Nipple eversion	Nipple inversion	Subareolar abscess
			Mammary duct fistula
Later reproductive years (age 25–40 y)	Cyclical changes of menstruation	Cyclical mastalgia	Incapacitating mastalgia
		Nodularity	
	Epithelial hyperplasia of pregnancy	Bloody nipple discharge	

	Normal	Disorder	Disease
Involution (age 35–55 y)	Lobular involution	Macrocysts	—
		Sclerosing lesions	
	Duct involution		
	Dilatation	Duct ectasia	Periductal mastitis
	Sclerosis	Nipple retraction	—
	Epithelial turnover	Epithelial hyperplasia	Epithelial hyperplasia with atypia

EARLY REPRODUCTIVE YEARS

Fibroadenomas are seen predominantly in younger women aged 15 to 25 years.53 Fibroadenomas usually grow to 1 or 2 cm in diameter and then are stable but may grow to a larger size. Small fibroadenomas (1 cm in size) are considered normal, whereas larger fibroadenomas (3 cm) are disorders and giant fibroadenomas (>3 cm) are disease. Similarly, multiple fibroadenomas (more than five lesions in one breast) are very uncommon and are considered disease. The precise etiology of adolescent breast hypertrophy is unknown. A spectrum of changes from limited to massive stromal hyperplasia (gigantomastia) is seen. Nipple inversion is a disorder

of development of the major ducts, which prevents normal protrusion of the nipple. Mammary duct fistulas arise when nipple inversion predisposes to major duct obstruction, leading to recurrent subareolar abscess and mammary duct fistula.

LATER REPRODUCTIVE YEARS

Cyclical mastalgia and nodularity usually are associated with premenstrual enlargement of the breast and are regarded as normal. Cyclical pronounced mastalgia and severe painful nodularity are viewed differently than are physiologic discomfort and lumpiness. Painful nodularity that persists for >1 week of the menstrual cycle is considered a disorder. In epithelial hyperplasia of pregnancy, papillary projections sometimes give rise to bilateral bloody nipple discharge.

INVOLUTION

Involution of lobular epithelium is dependent on the specialized stroma around it. However, an integrated involution of breast stroma and epithelium is not always seen, and disorders of the process are common. When the stroma involutes too quickly, alveoli remain and form microcysts, which are precursors of macrocysts. Macrocysts are common, are often subclinical, and do not require specific treatment. Sclerosing adenosis is considered a

disorder of both the proliferative and the involutional phases of the breast cycle. Duct ectasia (dilated ducts) and periductal mastitis are other important components of the ANDI classification. Periductal fibrosis is a sequela of periductal mastitis and may result in nipple retraction. Sixty percent of women 70 years of age exhibit some degree of epithelial hyperplasia. Atypical proliferative diseases include ductal and lobular hyperplasia, both of which display some features of carcinoma in situ. Women with atypical ductal or lobular hyperplasia have a fourfold increase in breast cancer risk (Table 17-4).

TABLE 17-4 CANCER RISK ASSOCIATED WITH BENIGN BREAST DISORDERS AND IN SITU CARCINOMA OF THE BREAST

Abnormality	Relative Risk
Nonproliferative lesions of the breast	No increased risk
Sclerosing adenosis	No increased risk
Intraductal papilloma	No increased risk
Florid hyperplasia	1.5 to 2-fold
Atypical lobular hyperplasia	4-fold
Atypical ductal hyperplasia	4-fold
Ductal involvement by cells of atypical ductal hyperplasia	7-fold
Lobular carcinoma in situ	10-fold
Ductal carcinoma in situ	10-fold

Source: Modified from Dupont WD, et al: Risk factors for breast cancer in women with proliferative breast disease. *N Engl J Med* 312:146, 1985.

TABLE 17-5 CLASSIFICATION OF BENIGN BREAST DISORDERS

Nonproliferative disorders of the breast
Cysts and apocrine metaplasia
Duct ectasia
Mild ductal epithelial hyperplasia
Calcifications
Fibroadenoma and related lesions
Proliferative breast disorders without atypia
Sclerosing adenosis
Radial and complex sclerosing lesions
Ductal epithelial hyperplasia
Intraductal papillomas
Atypical proliferative lesions
Atypical lobular hyperplasia
Atypical ductal hyperplasia

Source: Modified from Consensus Meeting[29] with permission.

PATHOLOGY OF NONPROLIFERATIVE DISORDERS

Of paramount importance for the optimal management of benign breast disorders and diseases is the histologic differentiation of benign, atypical, and malignant changes.54,55 Determining the clinical significance of these changes is a problem that is compounded by inconsistent nomenclature. The classification system originally developed by Page separates the various types of benign breast disorders and diseases into three clinically relevant groups: nonproliferative disorders, proliferative disorders without atypia, and proliferative disorders with atypia (Table 17-5). Nonproliferative disorders of the breast account for 70% of benign breast conditions and carry no increased risk for the development of breast cancer. This category includes cysts, duct ectasia, periductal mastitis, calcifications, fibroadenomas, and related disorders

Breast macrocysts are an involutional disorder, have a high frequency of occurrence, and are often multiple. Duct ectasia is a clinical syndrome characterized by dilated subareolar ducts that are palpable and often associated with thick nipple discharge. Haagensen regarded duct ectasia as a primary event that led to stagnation of secretions, epithelial ulceration, and leakage of duct

secretions (containing chemically irritating fatty acids) into periductal tissue.57

This sequence was thought to produce a local inflammatory process with periductal fibrosis and subsequent nipple retraction. An alternative theory considers periductal mastitis to be the primary process, which leads to weakening of the ducts and secondary dilatation. It is possible that both processes occur and together explain the wide spectrum of problems seen, which include nipple discharge, nipple retraction, inflammatory masses, and abscesses.

Calcium deposits are frequently encountered in the breast. Most are benign and are caused by cellular secretions and debris or by trauma and inflammation. Calcifications that are associated with cancer include microcalcifications, which vary in shape and density and are <0.5 mm in size, and fine, linear calcifications, which may show branching. Fibroadenomas have abundant stroma with histologically normal cellular elements. They show hormonal dependence similar to that of normal breast lobules in that they lactate during pregnancy and involute in the postmenopausal period. Adenomas of the breast are well circumscribed and are

composed of benign epithelium with sparse stroma, which is the histologic feature that differentiates them from fibroadenomas.

They may be divided into tubular adenomas and lactating adenomas. Tubular adenomas are seen in young nonpregnant women, whereas lactating adenomas are seen during pregnancy or during the postpartum period. Hamartomas are discrete breast tumors that are usually 2 to 4 cm in diameter, firm, and sharply circumscribed. Adenolipomas consist of sharply circumscribed nodules of fatty tissue that contain normal breast lobules and duct.

FIBROCYSTIC DISEASE

The term fibrocystic disease is nonspecific. Too frequently, it is used as a diagnostic term to describe symptoms, to rationalize the need for breast biopsy, and to explain biopsy results. Synonyms include fibrocystic changes, cystic mastopathy, chronic cystic disease, chronic cystic mastitis, Schimmelbusch's disease, mazoplasia, Cooper's disease, Reclus' disease, and fibroadenomatosis. Fibrocystic disease refers to a spectrum of histopathologic changes that are best diagnosed and treated specifically.

PATHOLOGY OF PROLIFERATIVE DISORDERS WITHOUT ATYPIA

Proliferative breast disorders without atypia include sclerosing adenosis, radial scars, complex sclerosing lesions, ductal epithelial hyperplasia, and intraductal papillomas.54,55 Sclerosing adenosis is prevalent during the childbearing and perimenopausal years and has no malignant potential. Histologic changes are both proliferative (ductal proliferation) and involutional (stromal fibrosis, epithelial regression). Sclerosing adenosis is characterized by distorted breast lobules and usually occurs in the context of multiple microcysts, but occasionally presents as a palpable mass. Benign calcifications are often associated with this disorder. Central sclerosis and varying degrees of epithelial proliferation, apocrine metaplasia, and papilloma formation characterize radial scars and complex sclerosing lesions of the breast. Lesions up to 1 cm in diameter are called radial scars, whereas larger lesions are called complex sclerosing lesions. Radial scars originate at sites of terminal duct branching where the characteristic histologic changes radiate from a central area of fibrosis. All of the histologic features of a radial scar are seen in the larger complex sclerosing lesions, but there is a greater disturbance of structure with papilloma

formation, apocrine metaplasia, and occasionally sclerosing adenosis.

Mild ductal hyperplasia is characterized by the presence of three or four cell layers above the basement membrane. Moderate ductal hyperplasia is characterized by the presence of five or more cell layers above the basement membrane. Florid ductal epithelial hyperplasia occupies at least 70% of a minor duct lumen. It is found in >20% of breast tissue specimens, is either solid or papillary, and is associated with an increased cancer risk (see Table 17-4). Intraductal papillomas arise in the major ducts, usually in premenopausal women. They generally are <0.5 cm in diameter but may be as large as 5 cm. A common presenting symptom is nipple discharge, which may be serous or bloody. Grossly, intraductal papillomas are pinkish tan, friable, and usually attached to the wall of the involved duct by a stalk. They rarely undergo malignant transformation, and their presence does not increase a woman's risk of developing breast cancer (unless accompanied by atypia). However, multiple intraductal papillomas, which occur in younger women and are less frequently associated with nipple discharge, are susceptible to malignant transformation.

PATHOLOGY OF ATYPICAL PROLIFERATIVE DISEASES

The atypical proliferative diseases have some of the features of carcinoma in situ but either lack a major defining feature of carcinoma in situ or have the features in less than fully developed form.57 In 1978, Haagensen and colleagues described lobular neoplasia, a spectrum of disorders ranging from atypical lobular hyperplasia to lobular carcinoma in situ (LCIS).58

TREATMENT OF SELECTED BENIGN BREAST DISORDERS AND DISEASES

CYSTS

Because needle biopsy of breast masses may produce artifacts that make mammography assessment more difficult, many radiologists prefer to image breast masses before performing needle biopsy.[59,60] In practice, however, the first investigation of palpable breast masses is frequently needle biopsy, which allows for the early diagnosis of cysts. A 21-gauge needle attached to a 10-mL syringe is placed directly into the mass, which is fixed by fingers of the nondominant hand. The volume of a typical cyst is 5 to 10 mL but it may be 75 mL or more. If the fluid that is aspirated is not bloodstained, then the cyst is aspirated to dryness, the needle is removed, and the fluid is discarded, because cytologic examination of such fluid is not cost effective. After aspiration, the breast is

carefully palpated to exclude a residual mass. If one exists, ultrasound examination is performed to exclude a persistent cyst, which is reaspirated if present. If the mass is solid, a tissue specimen is obtained. When cystic fluid is bloodstained, 2 mL of fluid is taken for cytologic examination. The mass is then imaged with ultrasound and any solid area on the cyst wall is sampled by needle biopsy. The presence of blood is usually obvious, but in cysts with dark fluid, an occult blood test or microscopic examination will eliminate any doubt. The two cardinal rules of safe cyst aspiration are that (a) the mass must disappear completely after aspiration, and (b) the fluid must not be bloodstained. If either of these conditions is not met, then ultrasound with needle biopsy or pneumocystography can be performed. A simple cyst is rarely of concern, but a complex cyst may be the result of an underlying malignancy. A pneumocystogram is obtained by injecting air into the cyst and then obtaining a repeat mammogram. When this technique is used, the wall of the cyst cavity can be more carefully assessed for any irregularities.

FIBROADENOMAS

Removal of all fibroadenomas has been advocated irrespective of patient age or other considerations, and solitary

fibroadenomas in young women are frequently removed to alleviate patient concern. Yet most fibroadenomas are self-limiting and many go undiagnosed, so a more conservative approach is reasonable. Careful ultrasound examination with core-needle biopsy will provide for an accurate diagnosis. Ultrasonography may reveal specific features that are pathognomonic for fibroadenoma. In this situation a core-needle biopsy may not be necessary. Subsequently, the patient is counseled concerning the ultrasound and biopsy results, and excision of the fibroadenoma may be avoided. Cryoablation is an approved treatment for fibroadenomas of the breast. With short-term follow-up a significant percentage of fibroadenomas will decrease in size and will no longer be palpable.[61] However, many will remain palpable, especially those larger than 2 cm. Therefore, women should be counseled that the options for treatment include surgical removal, cryoablation, or observation.

SCLEROSING DISORDERS

The clinical significance of sclerosing adenosis lies in its mimicry of cancer. It may be confused with cancer on physical examination, by mammography, and at gross pathologic examination. Excisional biopsy and histologic examination are

frequently necessary to exclude the diagnosis of cancer. The diagnostic work-up for radial scars and complex sclerosing lesions frequently involves stereoscopic biopsy. It usually is not possible to differentiate these lesions with certainty from cancer by mammographic features, so biopsy is recommended. The mammographic appearance of a radial scar or sclerosing adenosis (mass density with spiculated margins) will usually lead to an assessment that the results of a core-needle biopsy showing benign disease are discordant with the radiographic findings. Breast radiologists will therefore often forego image-guided needle biopsy of a lesion suspicious for radial scar and refer the case directly to a surgeon for wire localized excisional biopsy.

PERIDUCTAL MASTITIS

Painful and tender masses behind the nipple-areola complex are aspirated with a 21-gauge needle attached to a 10-mL syringe. Any fluid obtained is submitted for cytologic examination and for culture using a transport medium appropriate for the detection of anaerobic organisms. In the absence of pus, women are started on a combination of metronidazole and dicloxacillin while awaiting the results of culture. Antibiotics are then continued based on sensitivity tests. Many cases respond satisfactorily, but when

considerable purulent material is present, surgical treatment is recommended. Unlike puerperal abscesses, a subareolar abscess is usually unilocular and often is associated with a single duct system. Preoperative ultrasound will accurately delineate its extent. The surgeon may either undertake simple drainage with a view toward formal surgery, should the problem recur, or proceed with definitive surgery. In a woman of childbearing age, simple drainage is preferred, but if there is an anaerobic infection, recurrent infection frequently develops. Recurrent abscess with fistula is a difficult problem and may be treated by fistulectomy or by major duct excision, depending on the circumstances (Table 17-6). When a localized periareolar abscess recurs at the previous site and a fistula is present, the preferred operation is fistulectomy, which has minimal complications and a high degree of success. However, when subareolar sepsis is diffuse rather than localized to one segment or when more than one fistula is present, total duct excision is the most expeditious approach. The first circumstance is seen in young women with squamous metaplasia of a single duct, whereas the latter circumstance is seen in older women with multiple ectatic ducts. Age is not always a reliable guide, however, and fistula excision is the preferred initial procedure for localized

sepsis irrespective of age. Antibiotic therapy is useful for recurrent infection after fistula excision, and a 2- to 4-week course is recommended before total duct excision.

TABLE 17-6 TREATMENT OF RECURRENT SUBAREOLAR SEPSIS

Suitable for Fistulectomy	Suitable for Total Duct Excision
Small abscess localized to one segment	Large abscess affecting >50% of the areolar circumference
Recurrence involving the same segment	Recurrence involving a different segment
Mild or no nipple inversion	Marked nipple inversion
Patient unconcerned about nipple inversion	Patient requests correction of nipple inversion
Younger patient	Older patient
No discharge from other ducts	Purulent discharge from other ducts
No prior fistulectomy	Recurrence after fistulectomy

Source: Modified with permission from Hughes LE: The duct ectasia/periductal mastitis complex, in Hughes LE, et al (eds): Benign Disorders and Diseases of the Breast: Concepts and Clinical Management. London: WB Saunders, 2000, p 162. Copyright © Elsevier.

MATERIALS AND METHODS

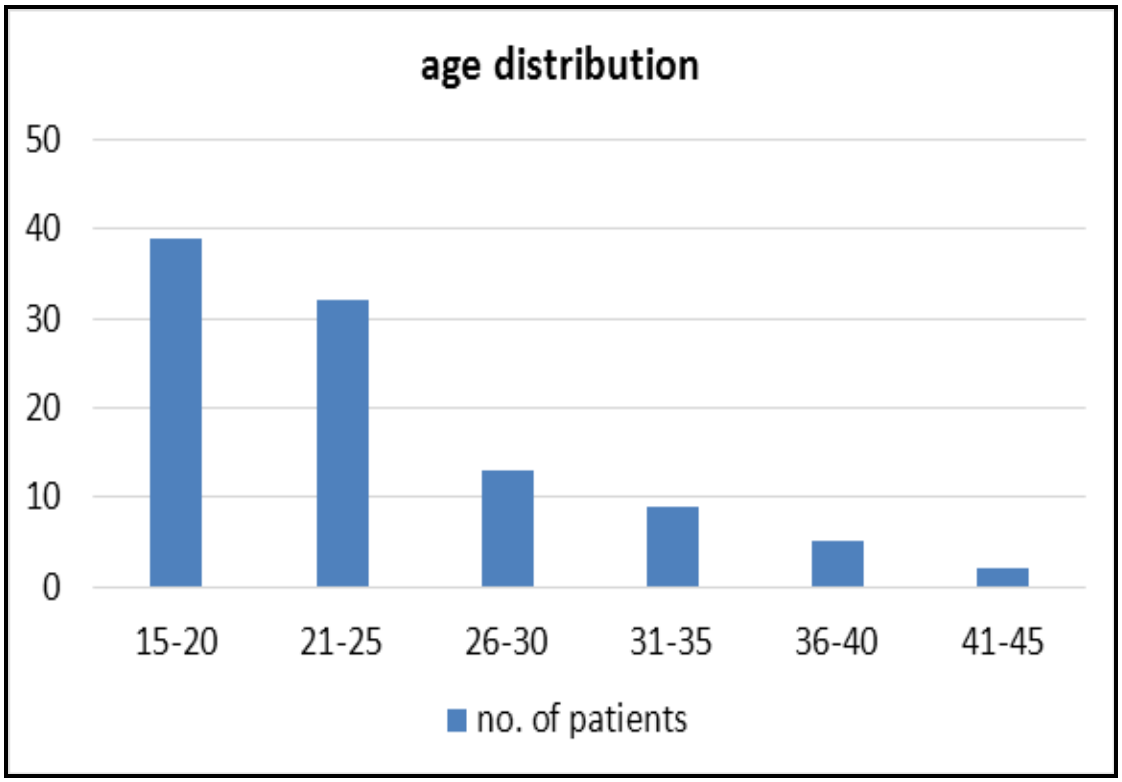
In this clinical study on women with mastalgia the data on these patients presenting to surgical outpatient department were collected after obtaining proper written informed consent from the patients or their guardians and analysed in comparison to the literature. The epidemiological parameters included in the study are age, body mass index, dietary habits, complaint of lumpiness of the breast, type of mastalgia whether cyclical or non-cyclical, menstrual habits and previous history of benign breast diseases. These patients undergo thorough breast examination and general examination and systematic examination and findings noted. Patients are classified by their age groups and body mass index calculated by obtaining weight in kilogram and height in meter. Dietary habits are classified as vegetarian or non-vegetarian but not noted about the frequency in which they consume meat. Complaint of lumpiness of one or both breasts was obtained and palpation of the breasts was carried out accordingly. Type of mastalgia is elicited by maintaining breast pain chart and relation to the mensus was noted as cyclical when it occurs 1-2 weeks prior to mensus and non-cyclical otherwise. Previous history of similar complaints in

the past including previous medical or surgical treatment for the same was noted. Married women with children were questioned about their breastfeeding practices and noted. Clinical breast examination findings were noted as absence of significant abnormality or lump or nodularity. Lump in the breast is investigated by international protocol of triple assessment by clinical, radiological and pathological means. All these patients who mostly present with fear of cancer are comforted with an ultrasound scan of the breast and axilla. These findings are noted as absence of significant abnormality or fibroadenoma, fibrocystic changes or abscess. Any patient with lump or nodularity detected by clinical or radiological means are subjected to fine needle aspiration cytology and reported as no abnormality detected or fibroadenoma or fibrocystic changes or abscess. Patients with abscess are offered immediate surgical treatment in the form of drainage and pus obtained is sent for culture and postoperative antibiotics accordingly. Lump in the breast that are more than 2 cm are excised and sent for histopathological examination. Other patients who are clinically and radiologically normal are treated with ascending order of reassurance, topical analgesics and breast support by sports brassieres, evening primrose oil and vitamins and

danazol guided by the patient's response to each treatment. Response is noted in terms of visual analogue scores of breast pain. The data thus obtained in 100 patients as prospective observational study over a period of 3 months study duration are analysed for patterns and relations.

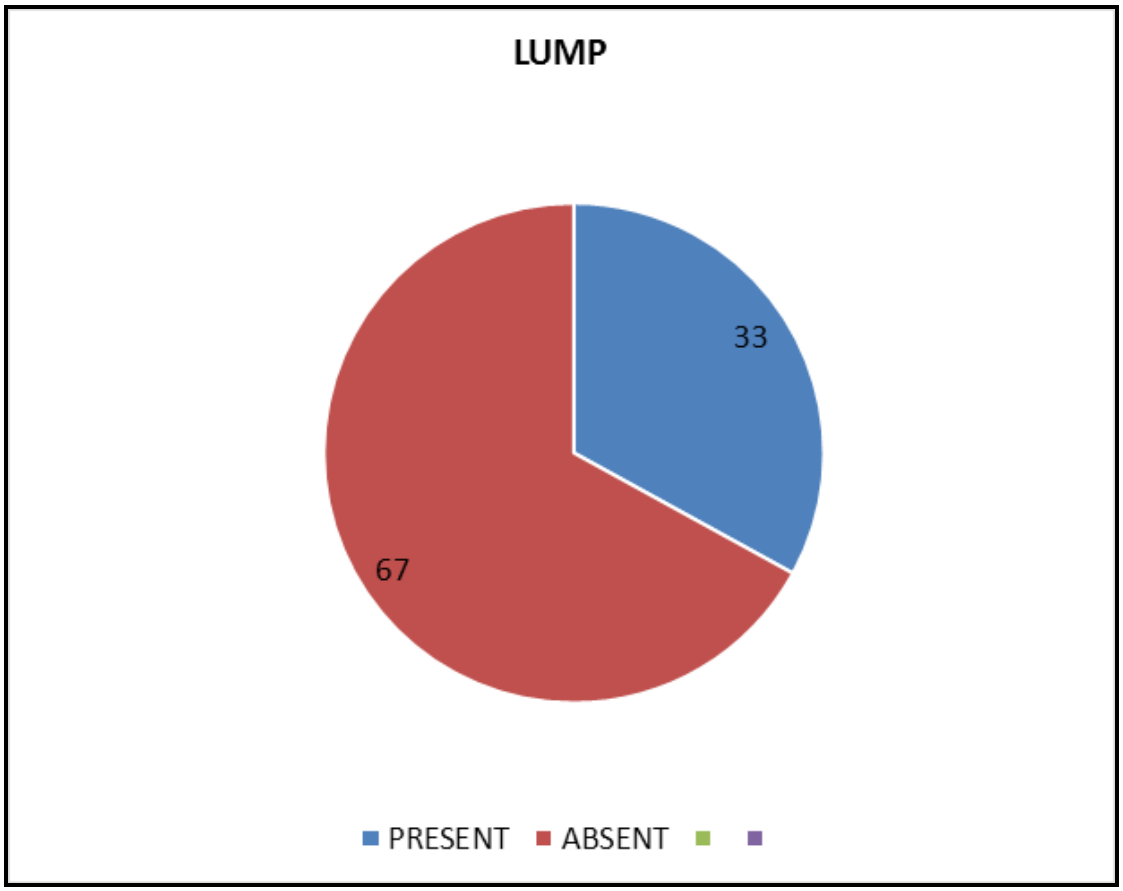
AGE AND MASTALGIA

AGE	NO. OF PATIENTS (n=100)	PERCENTAGE
15-20	39	39%
21-25	32	32%
26-30	13	13%
30-35	9	9%
36-40	5	5%
41-45	2	2%



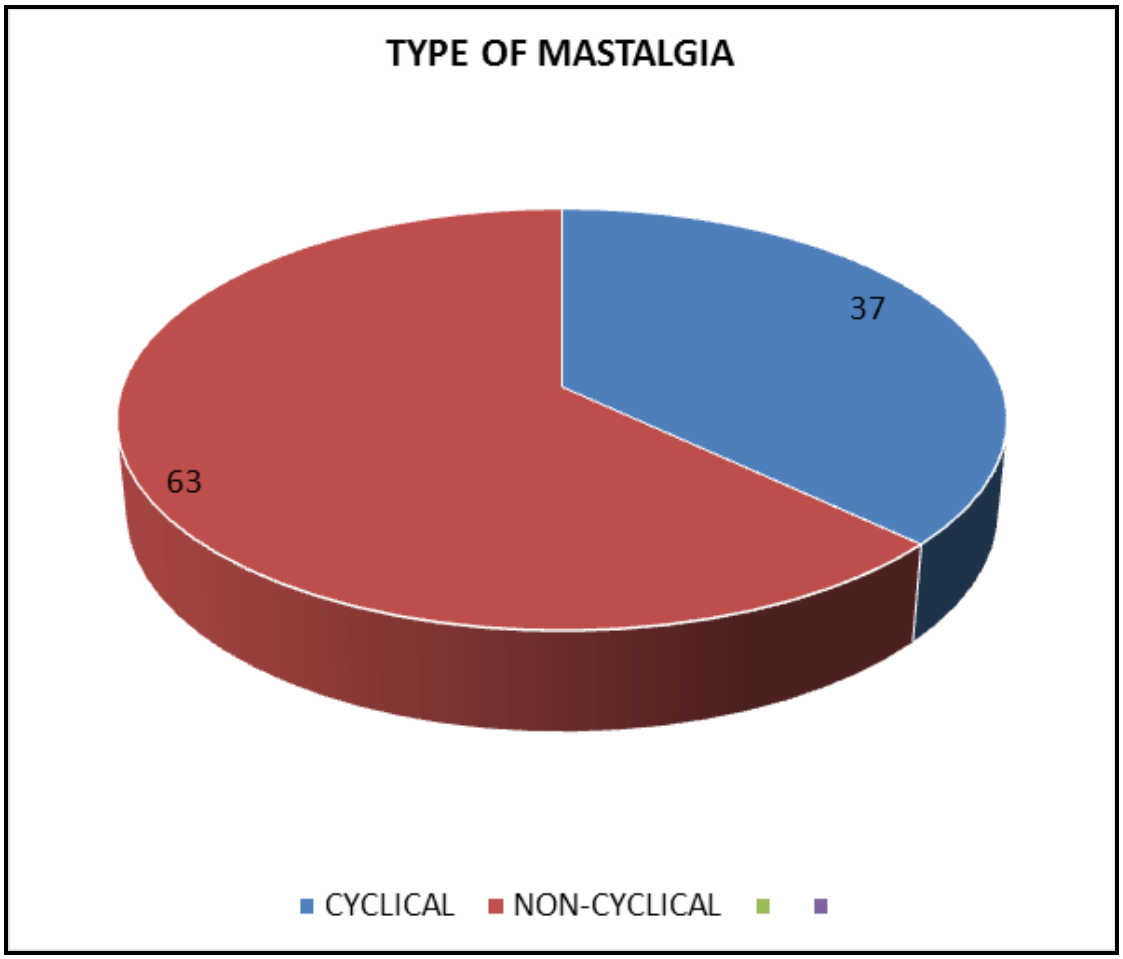
LUMP AND MASTALGIA

LUMP	NO.OF PATIENTS (n=100)	PERCENTAGE
PRESENT	33	33%
ABSENT	67	67%



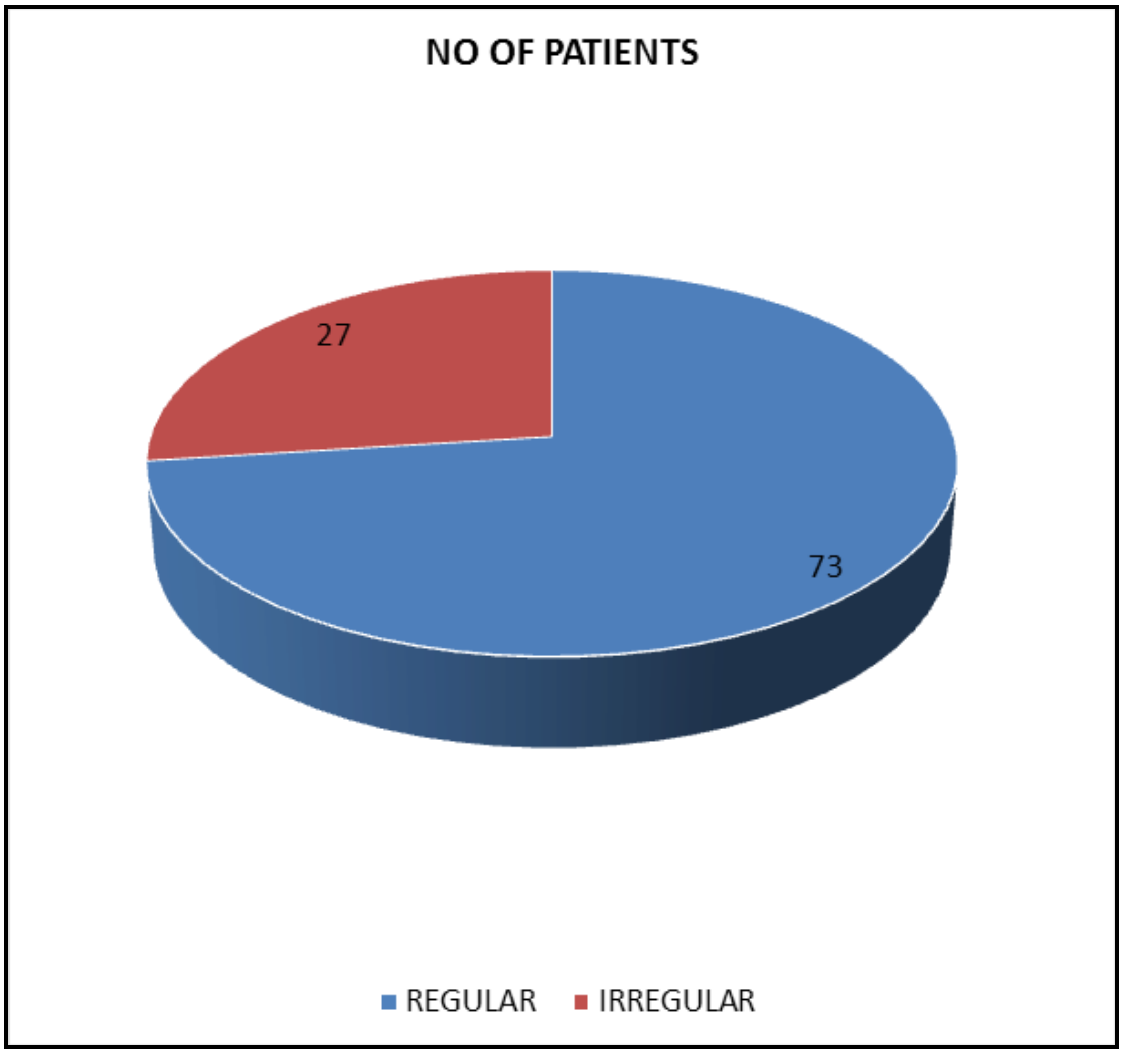
CYCLICITY OF MASTALGIA

TYPE OF MASTALGIA	NO. OF PATIENTS (n=100)	PERCENTAGE
CYCLICAL	37	37%
NON-CYCLICAL	63	63%



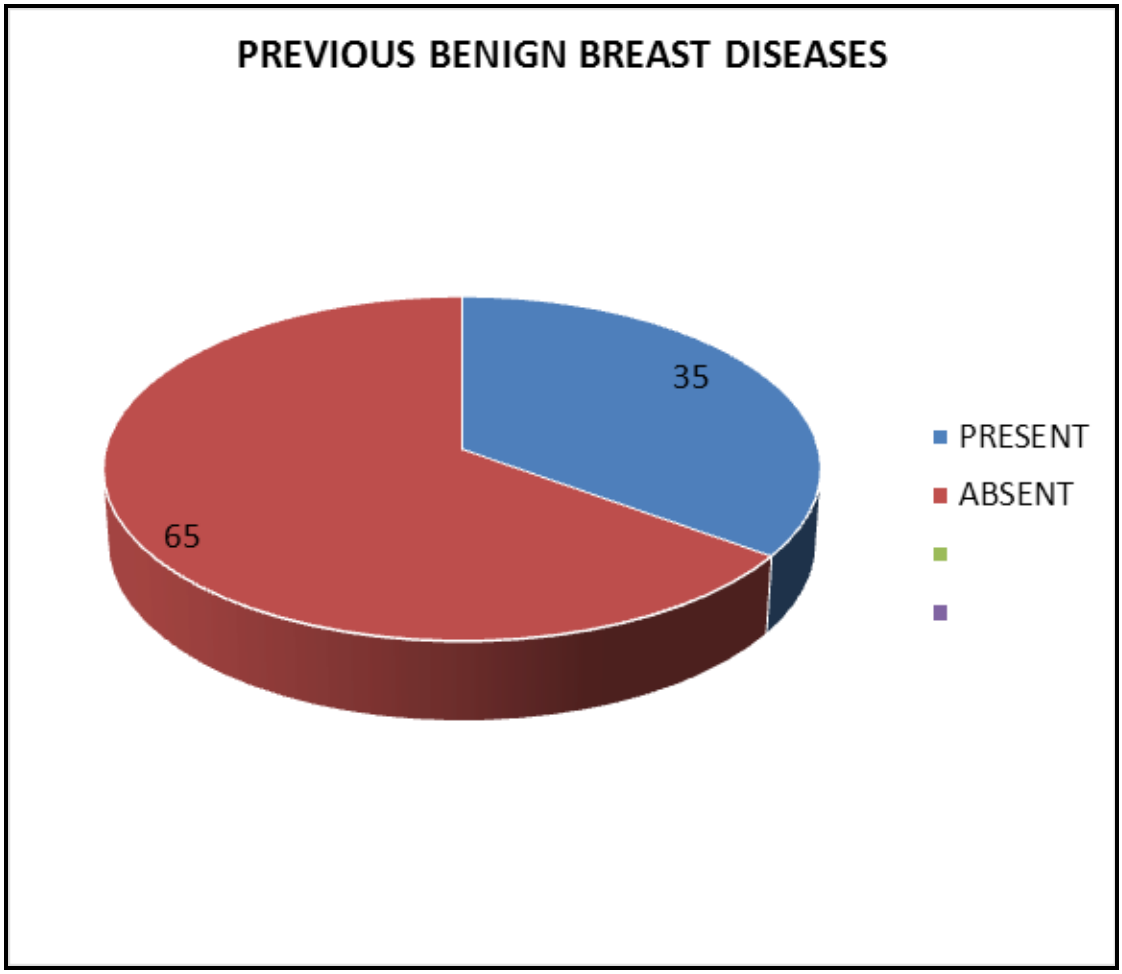
MENSTRUATION AND MASTALGIA

MENSTRUAL HABITS	NO OF PATIENTS(n=100)	PERCENTAGE
REGULAR	73	73%
IRREGULAR	27	27%



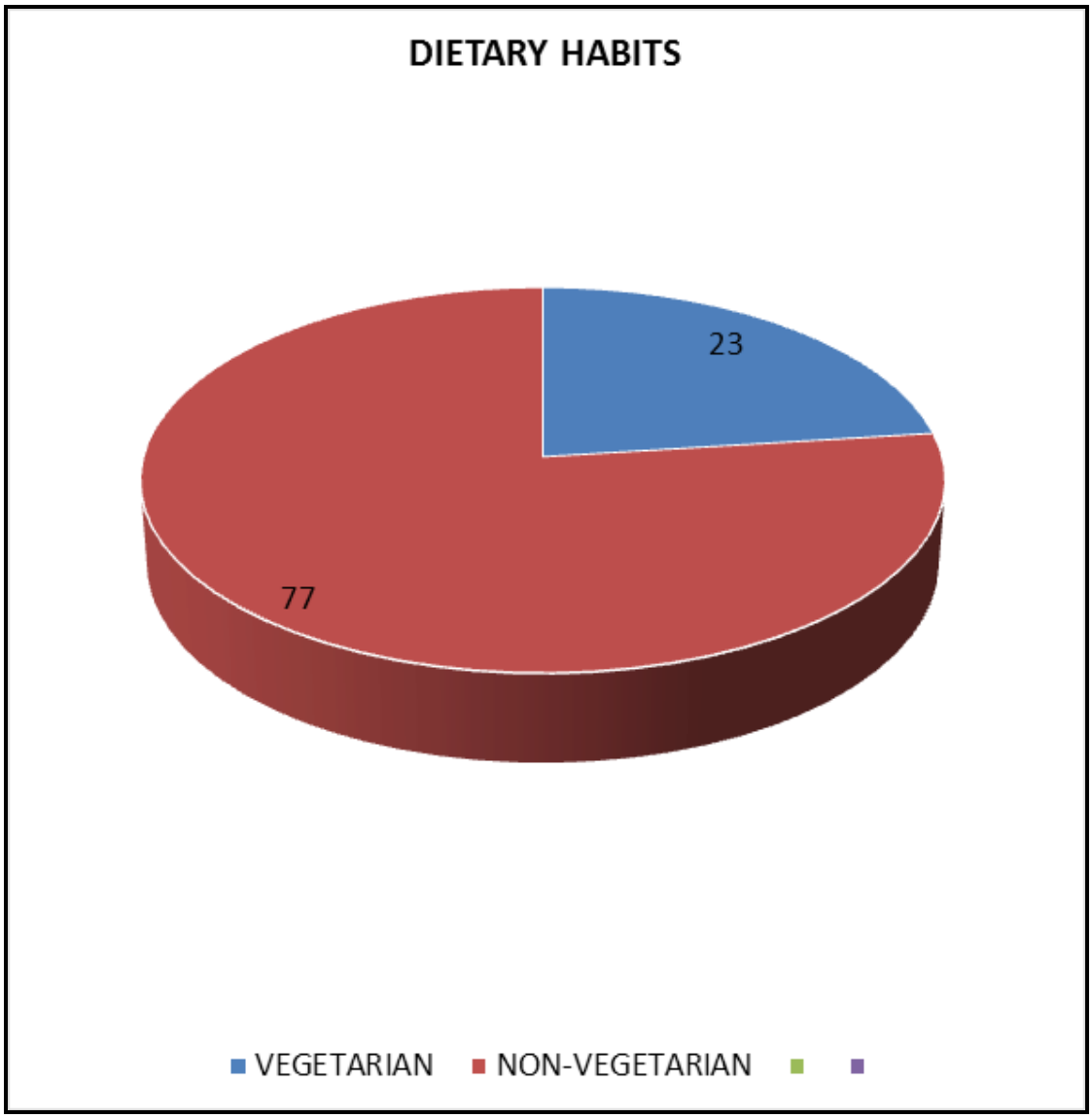
PREVIOUS BENIGN BREAST DISEASES

HISTORY	NO. OF PATIENTS	PERCENTAGE
PRESENT	35	35%
ABSENT	65	65%



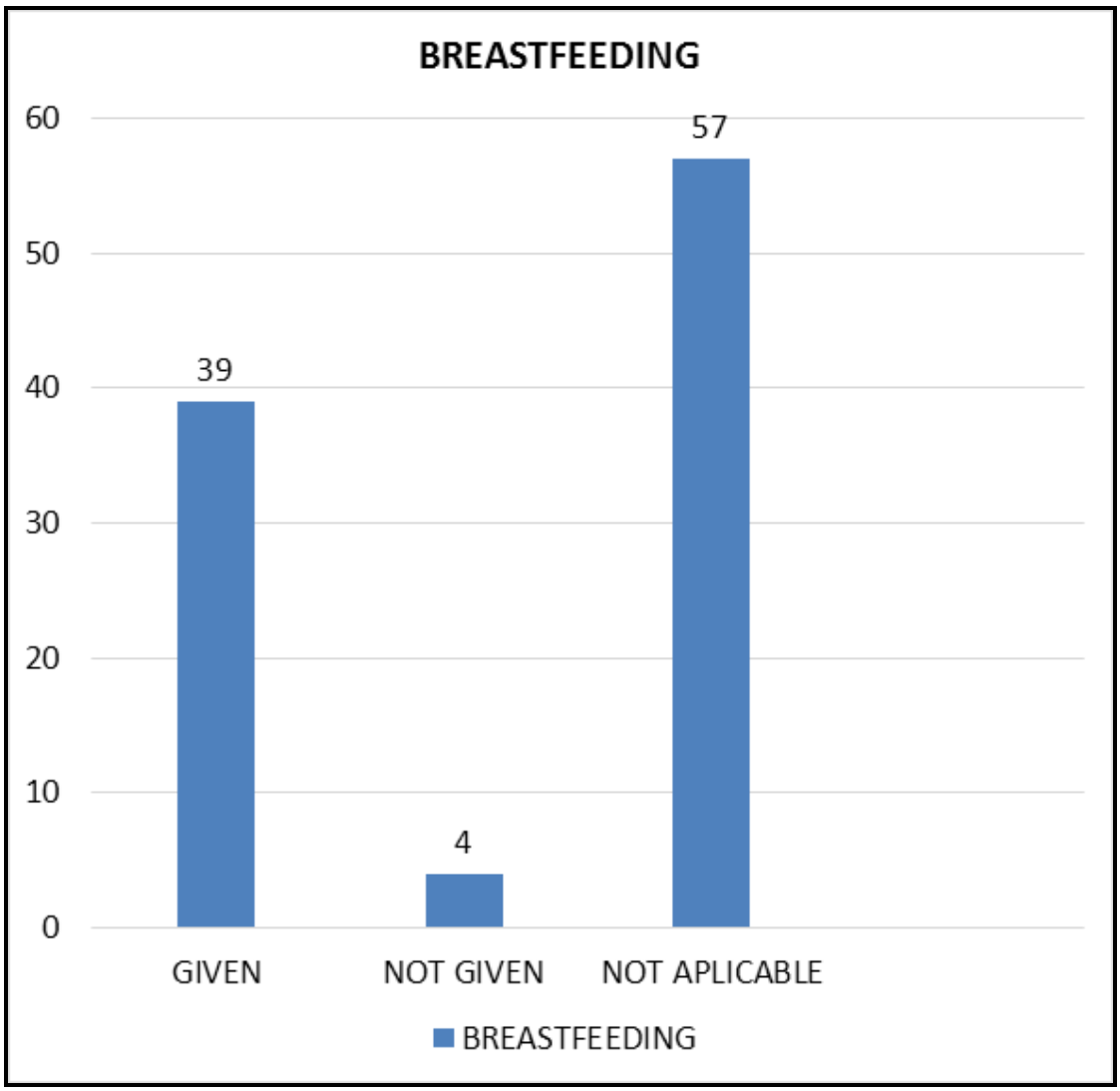
DIETARY HABITS

DIET	NO. OF PATIENTS (n=100)	PERCENTAGE
VEGETARIAN	23	23%
NON-VEGETARIAN	77	77%



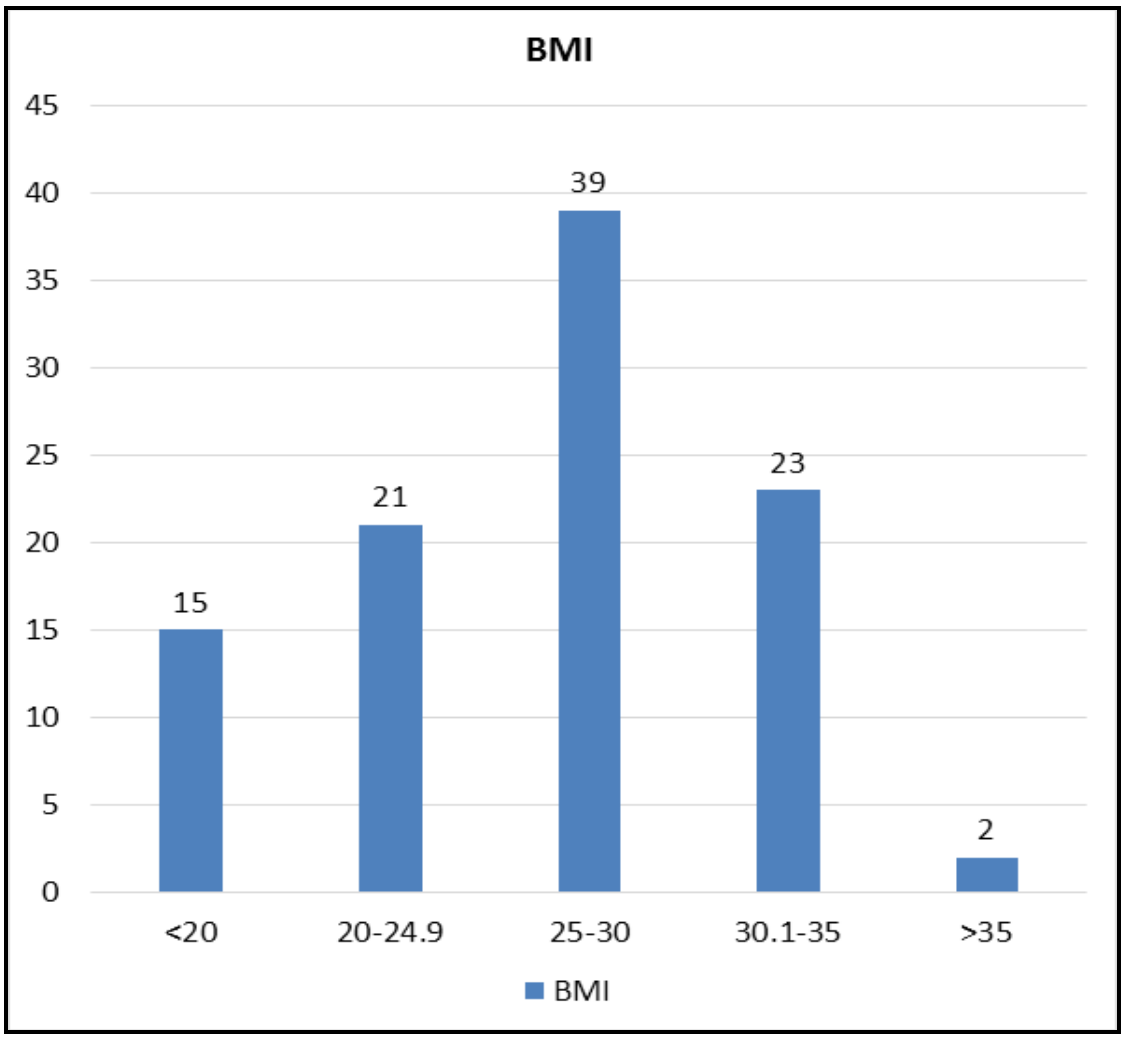
BREAST FEEDING AND MASTALGIA

BREASTFEEDING	NO. OF PATIENTS (n=100)	PERCENTAGE
GIVEN	39	39%
NOT GIVEN	4	4%
NOT APPLICABLE	57	57%



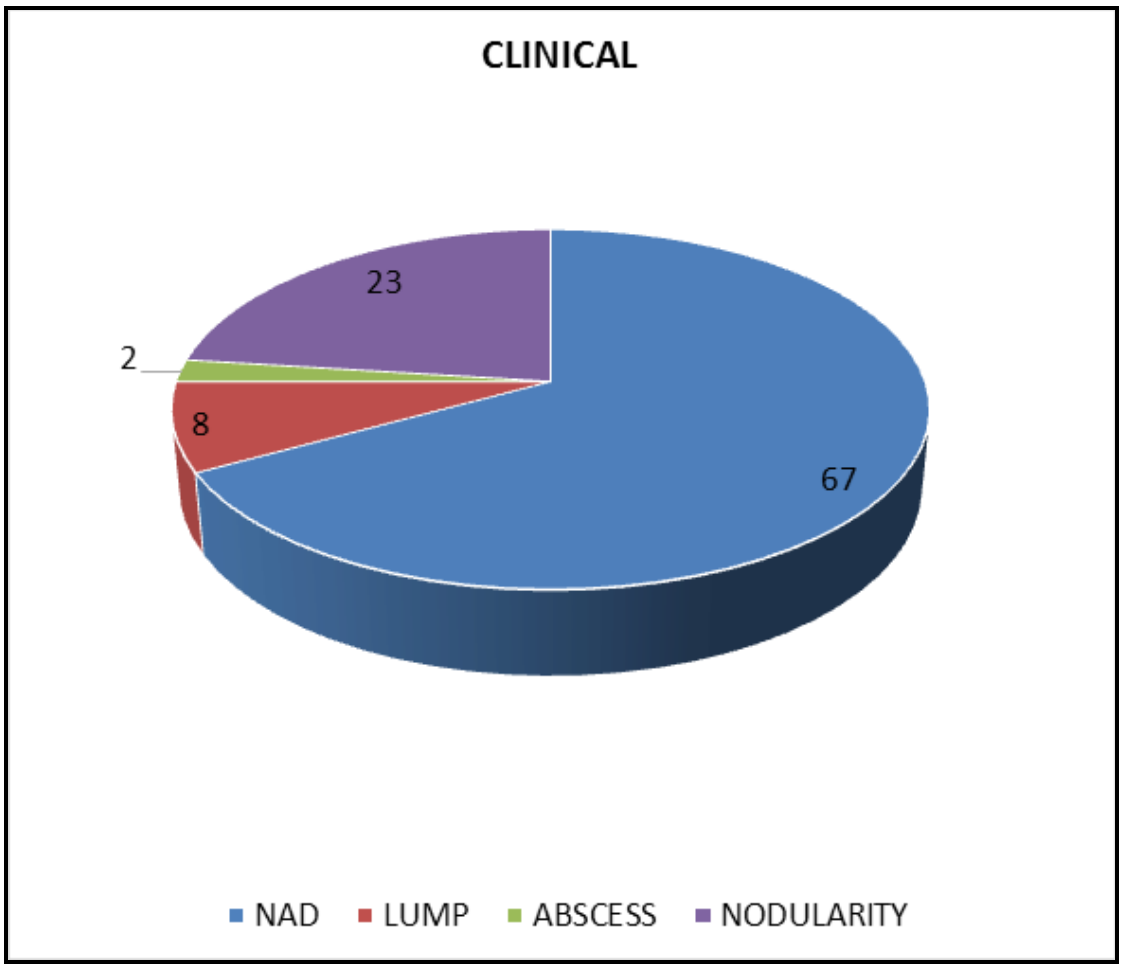
BODY MASS INDEX AND MASTALGIA

BMI	NO. OF PATIENTS (n=100)	PERCENTAGE
<20	15	15%
20-24.9	21	21%
25-30	39	39%
30.1-35	23	23%
>35	2	2%



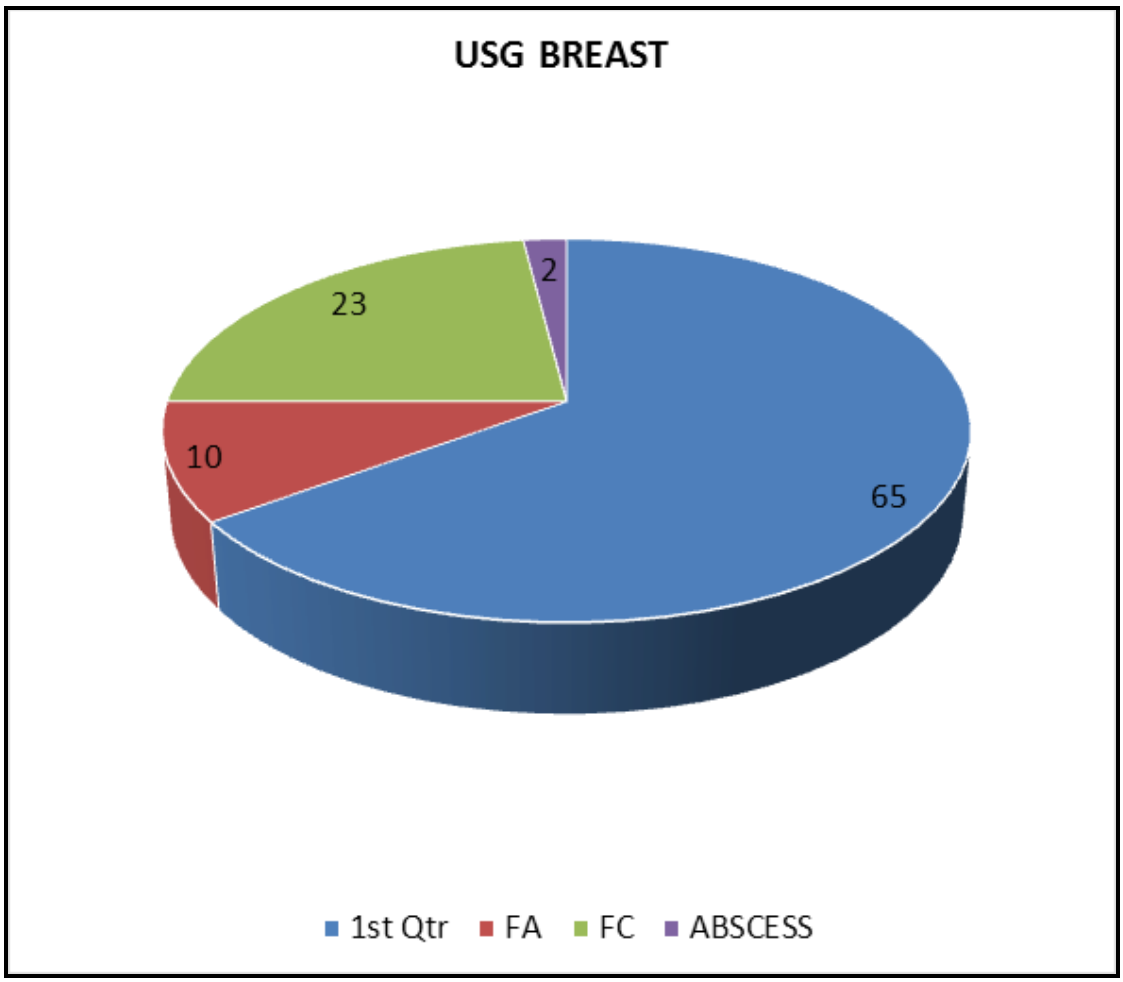
CLINICAL EXAMINATION FINDING

CLINICAL EXAMINATON	NO. OF PATIENTS (n=100)	PERCENTAGE
NAD	67	67%
LUMP	8	8%
ABSCESS	2	2%
NODULARITY	23	23%



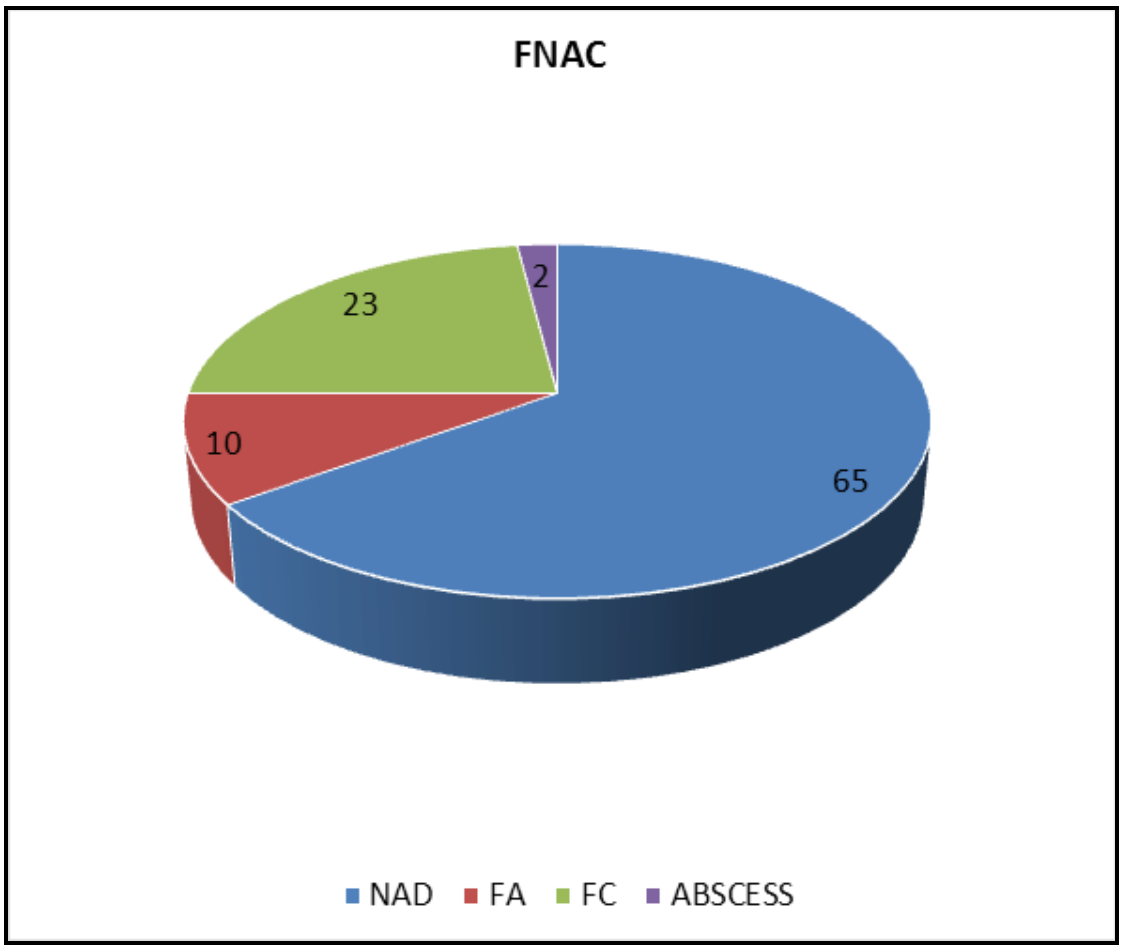
ULTRASOUND FINDINGS

USG FINDINGS	NO. OF PATIENTS (n=100)	PERCENTAGE
NAD	65	65%
FA	10	10%
FC	23	23%
ABSCESS	2	2%



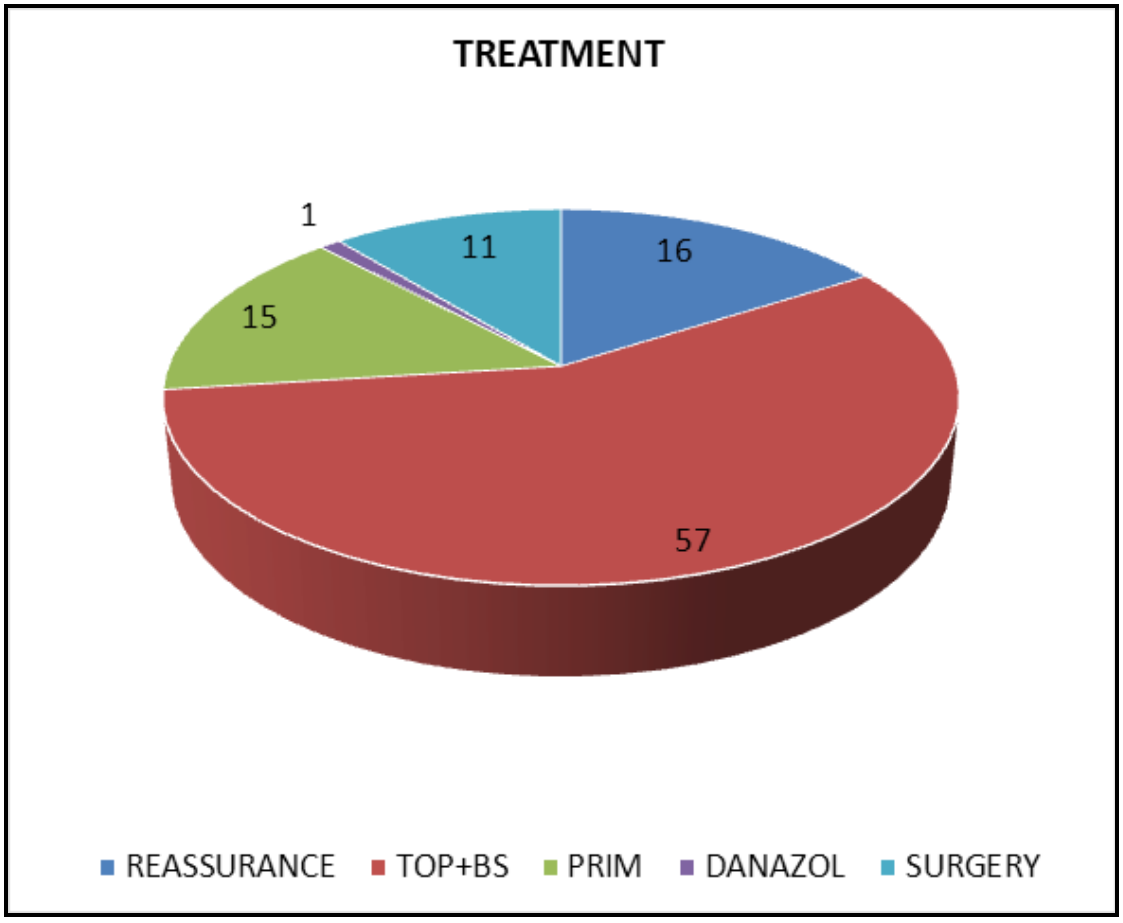
FNAC FINDINGS

FNAC FINDINGS	NO. OF PATIENTS (n=100)	PERCENTAGE
NAD	65	65%
FA	10	10%
FC	23	23%
ABSCESS	2	2%



TREATMENT

TREATMENT	NO. OF PATIENTS (n =100)	PERCENTAGE
REASSURANCE	16	16%
TOP+BS	57	57%
PRIM	15	15%
DANAZOL	1	1%
SURGERY	11	11%



DISCUSSION

AGE AND MASTALGIA

Mastalgia is most prevalent among women of reproductive age. The range of ages involved that are included in this study is between 15 and 45 years. The average age of patients presenting in our series is 23.8 years. The median age is 24 years. More than 72 patients were younger than 25 years of age.

The previous series published in Cardiff breast clinic highlights the fact that mastalgia is more a disease of women of reproductive age. The median age of their data was 36 years and their study population which included 212 women of age ranging between 12 and 51 years. [62]

AGE (Years)	OUR STUDY (n=100)	CARDIFF CLINIC (n=100)
MEDIAN	24	36
RANGE	15-45	12-51

In the Cardiff clinic study they also noticed when the onset of mastalgia is in early age the severity of illness tends to be more and persistent despite treatment measures. In our study the average duration of pain is more than 6 months and it is particularly high

among the women with previous history of pain in the past which corresponds to their observation.

LUMP AND MASTALGIA

Though mastalgia as a clinical condition is more prevalent than lump in the breast, it is the lump that is more worrisome in patient's mind. It draws attention to the previously prevalent breast pain and make them to seek medical advice. Fear of cancer among women is more widespread and recent efforts from government to create awareness in this field also has given some fruitful results in terms of increase in number of women who present with early stages of breast cancer which render them curable by surgery and chemotherapy.

Lump in the breast is the single most common presentation in carcinoma of the breast. Clinically it is possible to differentiate most of the cancerous lumps from the rest of it by its hard nature and involvement of skin or chest wall. Some of them presents by symptomatic metastatic deposits such as pathological fractures before drawing attention to the breast lump since they are not frequently associated with pain.

In a clinical study published in clinical obstetrics and gynaecology by Kelley et al breast lump is not one of a frequent association with breast pain in 350 patients and lumpiness as complained by the patients are mostly not of carcinomatous aetiology[63]. Lumpiness in our study is complained by 33% of patients and none of it was due to breast cancer as evaluated by international protocol of triple assessment of breast lumps by clinical, radiological and pathological methods.

Lumpiness of breast	**Our study (n=100)**	**Kelley et al (n=350)**
Present	33%	29%
Malignant	0	0

Though lumps in patients with breast pain are not associated with cancer it always advisable to take these as serious issues until malignancy is surely ruled out by appropriate investigations. This principle is followed since there is quite a few patients who present with lump and pain have their breast lumps for much longer duration than pain which is of recent onset.

TYPE OF MASTALGIA

Breast pain can be classified as cyclical and non-cyclical in relation to the menstrual cycle. Cyclical mastalgia is the one which

occurs 1-2 weeks prior to mensus. This pain is often bilateral and complained to involve diffusely the whole of the breast with occasional radiation to the upper arm and axilla.

Non-cyclical mastalgia is the one that lacks specific relation to the menstrual cycles. Cyclical mastalgia is usually prevalent among women aged 30-40 years.

It is found to be relieved with onset of mensus in about 22% of patients and being persistent in 65% of patients despite treatment.

In a study by srivastav et al conducted in AIIMS non-cyclical mastalgia is slightly more prevalent than cyclical mastalgia in north Indian women. In our study too this trend in favour of non-cyclical breast pain is observed.[64]

Type of breast pain	**Our study (n=100)**	**Srivastav et al (n=250)**
Cyclical	37%	44%
Non-cyclical	63%	56%

Patients with non-cyclical mastalgia may experience spontaneous resolution among 50% of them but still others may pose serious clinical problem with futile efforts in treating them.

MENSTRUATION AND MASTALGIA

It is popularly believed when breast pain due to altered hormonal status in women due to engorgement and ductal dilatation is present it is logical that uterus function in relation to this hormonal disarray should also be altered which manifests as irregular menstrual cycles. But this is not supported by evidence as in our study most of the patients have regular menstrual cycles. In the study conducted at AIIMS by srivastav et al similar results were observed.

Menstrual cycles	Our study (n=100)	Srivastav et al (n=250)
Regular	73%	65%
Irregular	27%	35%

There is also no strong evidence in literature that menstrual habits has any correlation to breast cancer when regularity is taken into account though the total number of cycles in a female's life is positively related to the disease risk. The regular cycles that is the feature in most of the females with breast pain is preceded by the pain in cases of cyclical mastalgia whereas it is difficult to establish this connection in patients with irregular cycles.

PREVIOUS BENIGN BREAST DISEASES IN MASTALGIA

Previous history of benign breast symptoms is a frequent association with the patients currently presenting with mastalgia. History of previous benign diseases for which patient has received medical or surgical treatment is elicited in our study which corresponds to this fact. In the study conducted in AIIMS by srivastav et al also gives the same impression.[64]

Previous breast disease	Our study (n=100)	Srivastav et al (n=250)
Present	35%	40%
Absent	65%	60%

A positive association in 35% of patients is significant proportion and hence when a patient comes for treatment of any breast complaints one can expect her to consult again for mastalgia in a later date. Though this point needs further studies with longer duration of followup to come to a conclusion. It is also noticeable that previous history of treatment for benign breast diseases is a risk factor for breast cancer though it is conclusive that mastalgia even when positively associated with previous benign diseases is not a risk factor for cancer perse.

DIETARY HABITS IN MASTALGIA

Dietary habits may play a role in causing breast pain though there is no strong evidence to rule in or rule out this argument and hence this factor is included in our study. Though most of the women participated in our study were non-vegetarians it is imperative to conduct large population based studies to come to a firm conclusion that non-vegetarian diet is a risk factor for breast pain. In the data published by srivastav et al from AIIMS in which most of the participants were vegetarians it was found that average breast pain scores were higher in non-vegetarian females.

Diet	Our study (n=100)	Srivastav et al (n=250)
Vegetarian	23	80
Non-vegetarian	77	20

In our study the average pain score is 2.7 and it is same among the vegetarian and non-vegetarians. So the previously quoted study might have some confounding factors. Vegetarian diet contains more fruits and vegetables which are rich sources for antioxidants and vitamins. Animal fat is associated with lots of non-communicable diseases ranging from ischemic heart disease to

cancer of the colon and breast but it is not sure whether this influences patients with breast pain. Hence there is no strong recommendation from this current study to advise women to give up their non-vegetarian dietary habits to get relieved of their breast pain, though they may reap other benefits.

BREASTFEEDING AND MASTALGIA

Breastfeeding is claimed to be one of the protective factor against breast cancer in women and hence our interest to look for any protection that it can offer against breastpain. In an epidemiological study from srivastav et al from AIIMS they say that there is no significant relation between feeding and breastpain. In our study too we can find similar results. Breastfeeding history was elicited and unmarried women and married but yet to deliver women were also included in the study. In our part of the world breastfeeding practices are strong and most of the mothers who participated in the study gave positive history for feeding and only 4% of women have not given breastmilk. But this seemingly increased incidence of breast pain among breastfed mothers is attributable to the above mentioned cultural practice of south indian women.

Breastfeeding practices	Our study	Srivastav et al
Given	39%	46%
Not given	4%	32%
Not applicable	57%	22%

Hence there is no firm evidence to make a recommendation of breastfeeding as a protective factor for breast pain but it need not be withheld in these patients since there is equally lack of evidence that it may increase the pain.

OBESITY AND MASTALGIA

During modern times obesity has increased among indian women due to the adaptation of western dietary habits and this has increased the incidence of non-communicable diseases such heart disease and stroke. It is also notable that obesity is associated to breast and colonic cancer. In women with breast pain obesity is not associated to the extent that it can be a cause. Obesity is classified according to the body mass index which is calculated by the formula by dividing the weight in kilogram by square of height in meter. The normal BMI is a range of 19-24.9. The average BMI in our study is found to be 26.9. This is slightly higher than the recommended norms and whether this reflects the overall increase

in obesity among the community rather than the women with mastalgia is yet to be ascertained. But it is always recommended that obese women must attempt to reduce weight to prevent the increased risk that it pose on cardiovascular health of the individual.

In our study only 36% of the women had normal BMI and 64% of them had increased BMI to various degrees but extremely morbid obesity is unusual among women presenting to our hospital which may be due to the fact that this hospital caters to the economically downtrodden people. Obese women are found to have higher pain scores in our study but this need to be confirmed with further large population based studies. Response to treatment is similar to non-obese females and hence it is not a routine schedule in the treatment.

CLINICAL EXAMINATION

Any patient presenting with breast pain must undergo a thorough physical examination including cardiovascular, chest wall and both breasts. In our study patients with breast pain beyond general examination were also subjected to thorough palpation of both breasts. Most of the patients do not present with clinically detectable abnormalities in breasts in our study that is in 67% of

patients. In our study 8% patients were presenting with clinically detectable lump in breasts and 23% were presenting with nodularity in one or both breasts. 2% were presenting with abscess which were not related to lactation. In a study published from AIIMS by srivastav et al also similar results in terms of absence of clinically detectable abnormalities in significant proportion of patients[64].

Clinical finding	Our study(n=100)	Srivastav et al(n=250)
NAD	67%	75%
Abscess	2%	-
Lump	8%	5%
Nodularity	23%	20%

INVESTIGATIONS

Patients were subjected to ultrasound examination and when significant abnormality is detected is subjected to fine needle aspiration cytology. Most of the patients with clinically normal breasts were also without any detectable abnormalities in ultrasound and only 2% exhibited nodularity in breasts that were undetectable clinically which proved to be fibroadenoma in FNAC. Ultrasound is highly sensitive in diagnosing fibroadenoma, abscess and fibrocystic disease. These findings correspond to the

cytological diagnosis in almost all the patients. These results are similar as in the series presented by srivastav et al[64].

Ultrasound	Our study(n=100)	Srivastav et al(n=250)
NAD	65%	74%
FA	10%	11%
FC	23%	15%
ABSCESS	2%	-

FNAC	Our study(n=100)	Srivastav et al(n=250)
NAD	65%	74%
FA	10%	11%
FC	23%	15%
Abscess	2%	-

TREATMENT

Most of the patients with clinically and investigation wise normal were treated by simple reassurance that it is not cancer and it will resolve spontaneously in most of similar patients and reported good resolution in pain scores. Others benefit from simple analgesics topically and breast support by sports brassiers. Considerable few have benefitted from evening primrose oil and vitamins but this benefit in relation to placebo is questionable from other evidences in literature. Patients with fibroadenoma who

presents with clinically worrisome lumps undergone surgery by excision biopsy and specimen reviewed histopathologically were found to be so and freed of anxiety. Abscess in breasts were surgically drained and antibiotics postoperatively according to the culture reports. The average relief in terms of pain scores by the above mentioned treatment modalities was 1.74. This result is the one observed by another study published by srivastav et al[64].

Treatment	Our study(n=100)	Srivastav et al(n=250)
Reassurance	16%	20%
Top+bs	57%	55%
Prim	15%	10%
Danazol	1%	-
surgery	11%	15%

CONCLUSION

1) Breast pain is mainly a clinical condition prevalent among females of reproductive age group.

2) Lumpiness of one or both breasts is a frequently associated complaint which requires detailed clinical examination and investigations.

3) Non-cyclical mastalgia is more prevalent than cyclical mastalgia among women in south India but it may need confirmation by further large population based studies.

4) Most of the females with breast pain have regular menstrual cycles.

5) Presence of previous breast complaints or treatment for them is often elicit able among these women.

6) Most of these women are non-vegetarians but this may reflect the general population character rather than its association as causality.

7) Breastfeeding does not seemingly protect against incidence of breast pain.

8) Breast pain may be more common among obese females but this fact needs further studies to confirm.

9) Clinical examination is more relevant in terms of ruling out significant pathologies of breast such as cancer rather than as a diagnosing tool. In our study none of these patients showed cancer pointing to the fact that most of the cancerous lumps are painless.

10) Triple assessment for any breast lump offers better diagnostic yield.

Most of these women are successfully treated with simple medications or reassurance. A fraction with lumps or abscess may require surgical treatment. Anti-estrogen therapy is indicated in rare occasions.

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DATA COLLECTION SHEET

I. Patient particulars:

Name I.p.No./o.p.no.

Case No.

Age DOA DOD

Address

Occupation:

II.Chief complaints (with duration)

A. Breast pain

B. Breast lump

C. Other complaints

PAST HISTORY

HISTORY OF PREVIOUS OPERATION

PERSONAL HISTORY

Diet:

Menstrual history:

Marital history:

EXAMINATION

General:

Height: Weight: Body Mass Index:

Breast examination:

INVESTIGATIONS

Radiological:

Ultrasound breast –

Mammogram-

Xray chest-

Pathological:

Fine needle aspiration-

Core needle biopsy-

TREATMENT

Reassurance

Oral NSAIDs

Topical NSAIDs

Centchroman

Danazol

Evening primrose oil

Surgery

FOLLOWUP

MASTERCHART

1	lakshmi	35	4	3	cyc	-	-	yes	non-veg	reg	P2L2	YES	19.3	NAD	NAD	-	NAD	-	TOP+BS	2
2	selvarani	30	3	5	cyc	+	5	NO	non-veg	reg	P2L2	YES	18.7	FA	FA	-	NAD	FA	SX	1
3	saradha	32	5	2	cyc	-	-	yes	non-veg	reg	P3L3	YES	21.2	NAD	NAD	-	NAD	-	TOP+BS	2
4	ellammal	35	4	3	cyc	-	-	yes	VEG	reg	P2L2	YES	23	NAD	FC	-	NAD	FC	PRIM	3
5	malathi	36	3	6	non-c	+	5	NO	non-veg	reg	P2L2	yes	25.3	NAD	NAD	-	NAD	-	TOP+BS	2
6	pitchammal	33	2	10	cyc	-	-	yes	non-veg	reg	P2L2	YES	32	NAD	NAD	-	NAD	-	TOP+BS	1
7	selvi	33	1	36	non-c	-	-	no	non-veg	reg	P3L3	YES	19.8	NAD	NAD	-	NAD	-	TOP+BS	0
8	reeta	24	3	6	non-c	-	-	no	veg	reg	P2L2	YES	25.3	NAD	NAD	-	NAD	-	TOP+BS	1
9	manimegalai	20	3	5	non-c	-	-	no	non-veg	reg	P1L1	YES	23.1	NAD	NAD	-	FIB	-	TOP+BS	1
10	divya	21	2	3	non-c	-	-	no	non-veg	reg	P1L1	YES	26.4	NAD	NAD	-	NAD	-	TOP+BS	1
11	saroja	31	2	5	non-c	-	-	no	non-veg	reg	P2L2	YES	27.3	NAD	NAD	-	NAD	-	TOP+BS	0
12	anandhi	26	4	6	non-c	-	-	yes	non-veg	reg	P1L1	YES	29.1	NAD	NAD	-	PNE	-	TOP+BS	1
13	banu	20	3	5	non-c	-	-	yes	non-veg	reg	P0A1	YES	18.9	NAD	NAD	-	NAD	-	TOP+BS	2
14	kalaiselvi	19	2	8	non-c	-	-	no	veg	reg	-	-	18	NAD	NAD	-	NAD	-	RE	1
15	poornima	30	5	2	cyc	-	-	yes	non-veg	reg	P3L3	YES	19.6	NAD	NAD	-	NAD	-	RE	2
16	somya	24	3	6	cyc	+	3	yes	non-veg	reg	P2L2	YES	23	FA	FA	-	NAD	FA	SX	1
17	sundari	21	2	2	non-c	-	-	no	non-veg	reg	P1L1	YES	22	NAD	NAD	-	NAD	-	TOP+BS	0
18	jalaja kumari	19	2	6	non-c	-	-	no	non-veg	irr	-	-	20.6	NAD	NAD	-	NAD	-	TOP+BS	1
19	varalakshmi	34	3	9	non-c	-	-	no	non-veg	irr	P2L2	YES	21.6	NAD	NAD	-	OST	-	TOP+BS	1
20	haripriya	22	4	5	non-c	-	-	yes	veg	reg	P1L1	YES	23	NAD	NAD	-	NAD	-	TOP+BS	0
21	sudha	19	2	5	cyc	+	2	no	veg	reg	-	-	18	FA	FA	-	NAD	FA	SX	0
22	jayashankari	20	2	6	cyc	+	6	yes	non-veg	irr	-	-	19	FA	FA	-	NAD	FA	SX	1
23	selvi	16	2	5	cyc	-	-	no	non-veg	reg	-	-	26.4	NAD	NAD	-	NAD	-	PRIM	0
24	sakunthala	31	4	4	non-c	-	-	no	non-veg	irr	P1L1	YES	24	NAD	NAD	-	NAD	-	RE	2

25	venmathi	21	3	12	cyc	-	-	no	non-veg	reg	-	-	26	NAD	NAD	-	NAD	-	TOP+BS	1
26	bhavani	23	5	6	non-c	-	-	yes	veg	irr	-	-	35	NAD	NAD	-	NAD	-	TOP+BS	1
27	joyce	33	3	1	non-c	-	-	yes	veg	reg	P2L2	YES	32.3	NAD	NAD	-	NAD	-	TOP+BS	1
28	kamala	20	2	18	non-c	-	-	no	non-veg	reg	-	-	31	NAD	NAD	-	NAD	-	TOP+BS	2
29	chandra	24	2	15	non-c	+	2	no	non-veg	reg	P1L1	YES	23	NOD	FC	-	NAD	FC	SX	1
30	devi	19	3	10	non-c	+	3	no	non-veg	reg	-	-	20.3	FA	FA	-	NAD	FA	SX	1
31	selvi	25	4	6	cyc	+	4	no	non-veg	reg	P2L2	YES	24	NOD	FC	-	NAD	FC	PRIM	3
32	bharathi	18	2	5	cyc	-	-	no	non-veg	reg	-	-	23.7	NAD	NAD	-	NAD	-	TOP+BS	1
33	sennyammal	30	3	4	cyc	-	-	no	non-veg	reg	-	-	20	NOD	NAD	-	NAD	-	TOP+BS	0
34	mala	22	4	3	cyc	-	-	yes	non-veg	irr	P1L1	YES	19.3	NAD	NAD	-	NAD	-	TOP+BS	2
35	nivedha	26	3	4	cyc	-	-	no	non-veg	irr	P1L1	YES	18.8	NAD	NAD	-	PTB	-	TOP+BS	1
36	zaibunisha	26	2	12	non-c	+	10	yes	veg	reg	P2L2	YES	36	FA	FA	-	NAD	FA	SX	1
37	tamilselvi	25	2	13	cyc	-	-	no	veg	reg	P3L3	YES	30	NAD	NAD	-	NAD	-	PRIM	0
38	parameshwari	25	4	2	non-c	+	2	yes	non-veg	reg	P3L2	NO	29	BA	BA	-	NAD	BA	SX	1
39	vijayalakshmi	44	3	5	non-c	-	-	no	non-veg	reg	P2L2	YES	28.6	NAD	NAD	NAD	NAD	-	RE	0
40	jayammal	27	2	5	non-c	-	-	no	non-veg	reg	P1L1	YES	29	NAD	NAD	-	NAD	-	TOP+BS	1
41	nalini	20	2	5	non-c	+	4	yes	non-veg	reg	-	-	30	NOD	FC	-	NAD	FC	RE	1
42	devika	22	3	6	non-c	-	-	yes	non-veg	reg	-	-	35	NAD	NAD	-	NAD	-	PRIM	1
43	ranganayaki	27	5	4	non-c	+	4	no	non-veg	reg	P0A1	-	32	BA	BA	-	NAD	BA	SX	0
44	jebhasanthi	39	2	5	non-c	-	-	no	veg	reg	P2L1	NO	31.6	NAD	NAD	-	NAD	-	TOP+BS	1
45	malliga	40	2	20	cyc	-	-	no	veg	reg	P2L1	YES	30.8	NAD	NAD	NAD	NAD	-	TOP+BS	1
46	vijiyarani	25	3	6	cyc	-	-	yes	non-veg	irr	P1L1	YES	29.6	NAD	NAD	-	NAD	-	RE	0
47	jayasudha	26	2	5	non-c	+	4	no	non-veg	reg	P2L2	YES	28.9	NOD	FC	-	NAD	FC	PRIM	1
48	geetha	36	6	2	non-c	+	2	no	non-veg	reg	-	-	27.3	NOD	FC	-	NAD	FC	DAN	3
49	indira	38	5	2	non-c	-	-	no	non-veg	irr	-	-	27.8	NAD	NAD	-	NAD	-	TOP+BS	3
50	rajalakshmi	45	4	5	cyc	+	4	no	non-veg	reg	P2L1	NO	32	FA	FA	FA	NAD	FA	SX	3
51	damayanthi	20	2	6	non-c	-	-	yes	non-veg	reg	-	-	34.1	NAD	NAD	-	NAD	-	TOP+BS	1
52	athira	21	2	5	cyc	+	3	yes	veg	reg	-	-	31.6	NOD	FC	-	NAD	FC	RE	0

53	aparna	23	2	4	non-c	-	-	no	non-veg	irr	-	-	29.4	NOD	FC	-	NAD	FC	RE	1
54	aarthi	25	2	8	cyc	+	6	no	non-veg	reg	P0	-	29.6	NOD	FC	-	NAD	FC	PRIM	1
55	aishwarya	24	2	5	cyc	-	-	no	veg	reg	-	-	28.3	NAD	NAD	-	NAD	-	TOP+BS	1
56	abinaya	26	3	6	non-c	-	-	no	non-veg	irr	-	-	26	NAD	NAD	-	NAD	-	TOP+BS	1
57	devapriya	22	2	6	non-c	-	-	no	non-veg	reg	-	-	31	NAD	NAD	-	NAD	-	TOP+BS	1
58	deepa	23	2	11	non-c	+	10	yes	non-veg	reg	P1L1	YES	30.4	NOD	FC	-	NAD	FC	TOP+BS	1
59	aruna	24	3	15	non-c	+	12	no	non-veg	irr	P1L1	NO	30	NOD	FC	-	PTB	FC	TOP+BS	1
60	ambika	19	2	5	cyc	-	-	yes	non-veg	reg	-	-	26	NAD	NAD	-	NAD	-	RE	2
61	arulmozhi	18	3	5	non-c	-	-	no	veg	irr	-	-	23	NAD	NAD	-	NAD	-	TOP+BS	1
62	kanimozhi	17	2	6	non-c	-	-	yes	veg	reg	-	-	24.1	NAD	NAD	-	NAD	-	TOP+BS	1
63	kalaiarasi	21	2	2	non-c	-	-	no	non-veg	reg	-	-	28.9	NAD	NAD	-	NAD	-	TOP+BS	1
64	kaviya	23	3	5	non-c	+	5	no	non-veg	reg	P1L1	YES	19.8	NOD	FC	-	NAD	FC	TOP+BS	1
65	thenmozhi	19	2	9	non-c	+	6	no	non-veg	reg	-	-	20	FA	FA	-	NAD	FA	SX	1
66	priyadarshini	16	3	6	cyc	-	-	no	non-veg	reg	-	-	31	NAD	NAD	-	NAD	-	PRIM	0
67	deepadarshini	18	2	6	non-c	-	-	no	non-veg	irr	-	-	36	NAD	NAD	-	NAD	-	TOP+BS	1
68	megha	26	2	5	cyc	+	5	no	non-veg	reg	P2L2	YES	40	NOD	FC	-	NAD	FC	TOP+BS	1
69	meenakshi	25	2	6	cyc	-	-	yes	non-veg	reg	P0	-	34.9	NAD	NAD	-	NAD	-	PRIM	1
70	archana	21	3	8	cyc	+	6	no	non-veg	reg	-	-	29	NOD	FC	-	NAD	FC	RE	1
71	suguna	19	2	3	non-c	-	-	yes	non-veg	reg	-	-	26	NAD	NAD	-	NAD	-	TOP+BS	0
72	shanmugapriya	22	2	7	non-c	+	6	no	veg	irr	-	-	34	NOD	FC	-	NAD	FC	RE	1
73	sivapriya	21	2	6	non-c	-	-	no	non-veg	reg	P1L1	YES	32	NAD	NAD	-	NAD	-	TOP+BS	0
74	kavitha	35	3	4	cyc	-	-	no	non-veg	irr	P2L2	YES	30	NAD	NAD	-	NAD	-	TOP+BS	1
75	sindhuja	20	2	6	non-c	-	-	yes	non-veg	reg	-	-	19	NAD	NAD	-	NAD	-	PRIM	1
76	padampriya	18	3	5	cyc	+	5	no	veg	irr	-	-	18	NAD	NAD	-	NAD	-	RE	0
77	elavarasi	16	2	4	cyc	-	-	no	non-veg	reg	-	-	32	NAD	NAD	-	NAD	-	TOP+BS	1
78	anitha	20	2	2	cyc	+	1	no	non-veg	reg	-	-	34	NAD	NAD	-	NAD	-	RE	0
79	chitra	21	3	10	non-c	-	-	yes	non-veg	reg	P1L1	YES	30	NAD	NAD	-	NAD	-	TOP+BS	0
80	annam	20	3	5	non-c	-	-	no	non-veg	reg	-	-	29	NAD	NAD	-	NAD	-	TOP+BS	1

81	sebastina	19	2	9	non-c	+	8	yes	non-veg	reg	-	-	25	NOD	FC	-	NAD	FC	RE	0
82	rebecca	18	4	6	non-c	-	-	yes	non-veg	reg	-	-	25.4	NAD	NAD	-	NAD	-	TOP+BS	2
83	kanchana	21	2	4	non-c	+	4	no	veg	irr	-	-	30	NOD	FC	-	NAD	FC	TOP+BS	1
84	sneha	17	2	8	non-c	-	-	no	veg	reg	-	-	29	NAD	NAD	-	NAD	-	PRIM	2
85	swathi	19	3	7	non-c	+	6	no	non-veg	irr	-	-	26.3	NAD	FC	-	NAD	FC	TOP+BS	1
86	shilpa	18	2	9	cyc	-	-	yes	non-veg	irr	-	-	19.3	NAD	NAD	-	NAD	-	TOP+BS	2
87	priyanka	16	2	6	non-c	-	-	yes	non-veg	irr	-	-	21.6	NAD	NAD	-	NAD	-	RE	1
88	mary	20	2	12	cyc	+	10	no	non-veg	reg	-	-	26.4	NAD	NAD	-	NAD	-	TOP+BS	0
89	nisha	23	3	10	non-c	-	-	yes	non-veg	reg	-	-	23.5	NAD	NAD	-	NAD	-	TOP+BS	2
90	nandini	22	2	11	non-c	-	-	no	veg	reg	P1L1	YES	21.1	NOD	NAD	-	NAD	-	PRIM	1
91	shalini	19	2	6	non-c	+	6	yes	veg	irr	-	-	35	NOD	FC	-	NAD	FC	PRIM	2
92	karpagam	18	2	9	non-c	-	-	no	veg	irr	-	-	30	NAD	NAD	-	NAD	-	TOP+BS	2
93	roja	27	3	8	cyc	+	8	no	veg	reg	P0	-	32	NAD	FA	-	NAD	FA	RE	1
94	sridevi	19	4	7	cyc	-	-	no	non-veg	reg	-	-	31	NOD	FC	-	NAD	FC	PRIM	2
95	sukanya	18	2	6	non-c	-	-	no	non-veg	irr	-	-	34	NAD	NAD	-	NAD	-	PRIM	0
96	keerthana	17	3	6	non-c	-	-	no	non-veg	irr	-	-	33	NAD	FC	-	NAD	FC	TOP+BS	1
97	mahalakshmi	16	2	6	non-c	+	6	no	non-veg	irr	-	-	22	NOD	FA	-	NAD	FA	TOP+BS	0
98	durga	15	2	5	non-c	-	-	no	non-veg	irr	-	-	19.9	NAD	NAD	-	NAD	-	TOP+BS	2
99	anupriya	20	3	8	cyc	-	-	yes	non-veg	reg	-	-	36	NOD	FC	-	NAD	FC	TOP+BS	2
100	amaravathi	21	2	6	non-c	-	-	yes	non-veg	reg	P1L1	YES	30	NOD	FC	-	NAD	FC	TOP+BS	1

INSTITUTIONAL ETHICS COMMITTEE
MADRAS MEDICAL COLLEGE, CHENNAI-3

EC Reg No.ECR/270/Inst./TN/2013
Telephone No. 044 25305301
Fax : 044 25363970

CERTIFICATE OF APPROVAL

To
Dr.V.C.Kalyanasundarabharathi
Postgraduate M.S.(General Surgery)
Madras Medical College
Chennai 600 003

Dear Dr.V.C.Kalyanasundarabharathi,

The Institutional Ethics Committee has considered your request and approved your study titled **"A clinical study on women presenting with mastalgia to a tertiary referral centre in South India" No.28072015.**

The following members of Ethics Committee were present in the meeting held on 07.07.2015 conducted at Madras Medical College, Chennai-3.

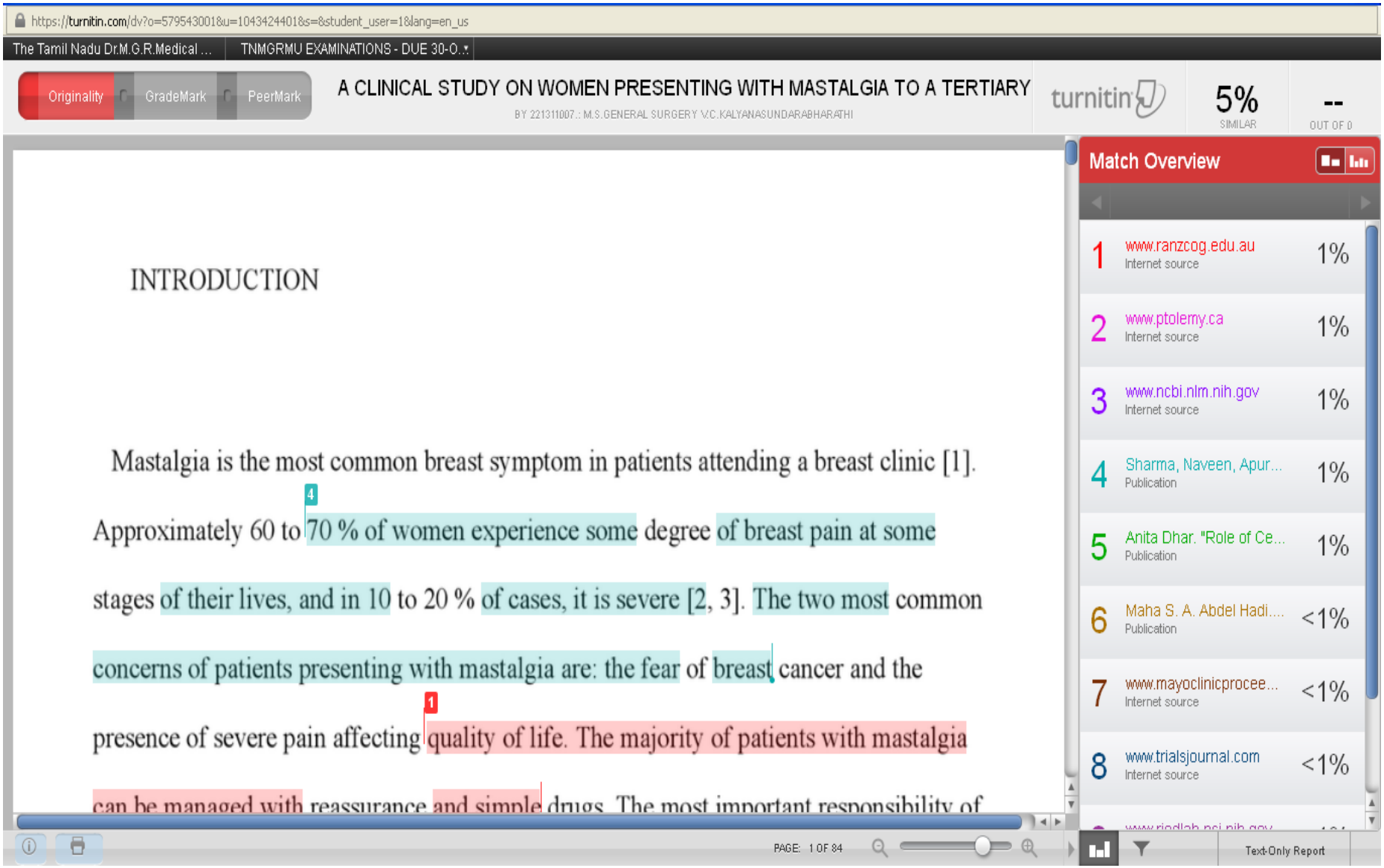
1. Prof.C.Rajendran, M.D.,	: Chairperson
2 Prof.R.Vimala, M.D., Dean, MMC, Ch-3	: Deputy Chairperson
3. Prof.Sudha Seshayyan, M.D., Vice-Principal, MMC, Ch-3	: Member Secretary
4. Prof.B.Vasanthi, M.D., Professor Pharmacology, MMC	: Member
5. Prof P.Ragumani, M.S., Professor, Inst.of Surgery, MMC	: Member
6. Prof.Md.Ali, M.D., D.M., Prof. & HOD of Medl.G.E., MMC	: Member
7. Prof.Baby Vasumathi, Director, Inst.of O&G, Ch-8	: Member
8. Prof.K.Ramadevi, Director, Inst.of Biochemistry, MMC	: Member
9. Prof.Saraswathy, M.D., Director, Inst. Of Pathology, MMC	: Member
10. Prof.Srinivasagalu, Director, Inst.of Inter Med. MMC	: Member
11. Thiru S.Rameshkumar, B.Com., MBA	: Lay Person
12. Thiru S.Govindasamy, B.A., B.L.,	: Lawyer
13. Tmt.Arnold Saulina, M.A., MSW.,	: Social Scientist

We approve the proposal to be conducted in its presented form.

The Institutional Ethics Committee expects to be informed about the progress of the study and SAE occurring in the course of the study, any changes in the protocol and patients information/informed consent and asks to be provided a copy of the final report.

Member Secretary, Ethics Committee

MEMBER SECRETARY
INSTITUTIONAL ETHICS COMMITTEE
MADRAS MEDICAL COLLEGE
CHENNAI-600 003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INTRODUCTION
Mastalgia is the most common breast symptom in patients attending a breast clinic [1]. Approximately 60 to 70 % of women experience some degree of breast pain at some stages of their lives, and in 10 to 20 % of cases, it is severe [2, 3]. The two most common concerns of patients presenting with mastalgia are: the fear of breast cancer and the presence of severe pain affecting quality of life. The majority of patients with mastalgia can be managed with reassurance and simple drugs. The most important responsibility of
Match Overview
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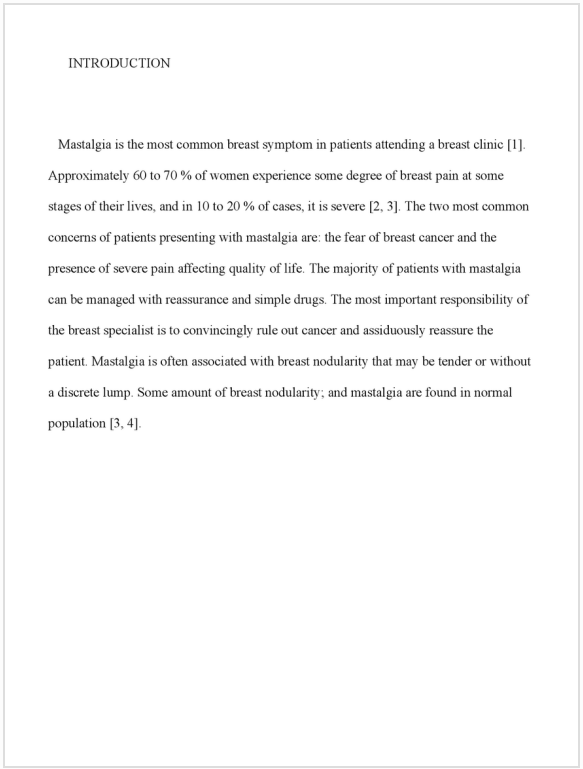

INTRODUCTION

Mastalgia is the most common breast symptom in patients attending a breast clinic [1]. Approximately 60 to 70 % of women experience some degree of breast pain at some stages of their lives, and in 10 to 20 % of cases, it is severe [2, 3]. The two most common concerns of patients presenting with mastalgia are: the fear of breast cancer and the presence of severe pain affecting quality of life. The majority of patients with mastalgia can be managed with reassurance and simple drugs. The most important responsibility of the breast specialist is to convincingly rule out cancer and assiduously reassure the patient. Mastalgia is often associated with breast nodularity that may be tender or without a discrete lump. Some amount of breast nodularity; and mastalgia are found in normal population [3, 4].